AMERICAN DYESTUFF REPORTER

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The Dyeing Machine---I

By HENRY BARKER BURKE

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Comments on Its Evolution and Development. Basic Principles utilized in Machine Dyeing. A Description of the Mechanical Functioning of Various Types of Dyeing Machines Common to American Dyehouses. Remarks Concerning the Choice of Dyeing Machines.

Of our industrial developments none has been more slighted than that of the mechanical application of dyestuffs. Even now, after at least 7,000 years of known application of various coloring matters to textile materials, we have no nomenclature inclusive of the appliances and machines used for this work. In the other branches of textile activity, we have evolved a specific nomenclature for machines producing a certain specific result.

WE have cards, mules, frames, doublers and winders; we have warpers, dryers, tenters, dollies, kiers, soapers, mangles, openers, steamers, extractors, presses and shears and so on thru the list. We have "weaving machines," but who upon hearing that phrase would have the clear conception that would follow had the designation been "looms." It is true "jiggers" or "jigs" bring to our mind a particular type of dyeing machine, likewise "kettles" more generally refer to hand skein dyeing equipment, while "tubs" give us a picture of loose or raw stock dyeing. But, for the most part, we must resort to cumbersome elementary terms to present our meaning. We can not gain a point of contact by any all-inclusive specific nomenclature, but must present our minds' picture to our neighbor by a roundabout interpretation. And who can say but this elementary descriptive method of gaining contact has had its effect in a retarded industrial development of the mechanical appliances for the application of dyestuffs to our textile fibers.

It seems very peculiar, although for the most part the sales of textile materials depend upon the attractiveness and the perfection of their colorings, that this phase of the manufacture should be given so little consideration by those in high authority. But it is a fact, nevertheless.

A certain officer of a large silk mill, marketing among other things thread and embroidery floss, covers his lack of knowledge of dyeing equipment by asserting that the cost of dyeing is a too insignificant part of the whole to worry about. A successful woolen manufacturer believes that to avoid trouble one must keep clear of the dyehouse, yet this gentleman would not try to avoid trouble by keeping clear of his yarn mill or weave shed. Still another successful executive of one of our large carpet mills states that the dyehouse gives him more trouble than all the other departments in the mill combined.

Eager questions are heard upon all sides, "How much should my dyehouse produce?" "How much should it cost me to dye a pound of my stock?" "How long should my equipment last?" "Are my repairs excessive?" "What is a fair percentage of redyes?" "Why do I have so many rejects?" "Don't you think I need a new dyer?" "Did anyone ever get satisfactory work with .....Color Company's dyes?"

It is a fact beyond dispute that the majority of high textile executives have a very broad general knowledge of looms, and it is likewise beyond dispute that this same majority have no fundamental knowledge or understanding of the dyeing machine.

Why do we find such a generally submissive attitude on the part of mill men toward the dyeing department? Where do all these questions originate, if not in the unenlightened mind of those who lack a fundamental and thorough knowledge of the equipment and the procedures of this branch of their work. When everybody seems out of step except ourselves, then it most often develops

that we ourselves are out of step. When the executive reads the riot act to his dyer, his dyestuff merchant, and the company who supplied him with dyeing equipment, he admits his own inability to control the situation, and he resorts to one of the most primitive modes of defense —noise, and plenty of it. And this same executive, should trouble have developed in the weave shed, would have exhibited no tendencies toward hysteria and would coolly and calmly have studied the situation with his weaver and would have found a solution both effective and practical.

It is very difficult to solve a quadratic equation even if all the preceding theorems have been duly mastered, but it is almost an impossibility unless they have been mastered. The management of a large textile plant is more complex than a book of quadratic equations, but it is somewhat similar, in that the solution of many of its problems depend upon a knowledge of the principles and the functions underlying its equipment and procedures. Many a mill is today operating a dyehouse from the profits of another of its departments, simply because those in highest authority, "don't know anything about dyeing machines," and pass the jurisdiction to others in high authority who qualify similarly.

There may, some day, be an accountant of vision and genius enough to depict in his totals the fact that the hand turning was too slow, that a rotary machine stick has failed to turn, that a circulating machine clutch has slipped, or that the pack machine was improperly loaded, and do it in such a manner that his superiors will register enlightenment. But it seems unlikely that this will transpire prior to the millennium. And so, a general knowledge of the principles of the now used machines becomes an essentially profitable subject for the textile executive to acquire.

Textile dyeing is not restricted to any one particular stage of the manufacturing process. And, while there are sound reasons for coloring at one stage or another of the manufacturing, it is extremely flexible, and is, in many instances, governed by local conditions, the character of the fabric being produced, or the demands placed upon it by the consumer.

In just which form textile coloring was first carried out is obscure. Egyptian hieroglyphics depict the printing of finished weaves* by hand block method, the immersion of webs of cloth in fire heated crocks of dye-liquor (piece-dyeing), and similarly, the immersion of skein yarns (skein dyeing), and also loose fibre (raw stock dyeing). It can be seen, then, that from the earliest, the mechanical development of dyeing has been hampered by the application of the coloring matter to a wide variety of physical conditions of the material under manufacture.

*It is now believed that this art had its origin in China and the East Indies and that the Egyptians acquired knowledge of it from these earlier users.

Classes of Dyeing

We "moderns" have in no way lessened the variety of points of color application but rather have added to them, until today we have:

Loose or Raw Stock Dyeing:
1. Natural fibre.
2. Regenerated stocks of all kinds.
3. Rags.
4. Hosiery.
5. Garments.

Skein Dyeing:
1. Various lengths and weights of skein yarns.
2. Slubbing, tapes, braids and various intermediate manufacturing conditions capable of being formed into skein.

Chain Warp Dyeing:
1. Single.
2. Doubled.
3. Bundled.

Slubbing:
1. Single.
2. Balled. (Top)
3. Skein.

Tops.

Ball Warps.

Beamed Yarns.

Coned or Spooled Yarns.

Cops.

Piece-goods:
1. Roped, endless and continuous.
2. Batched open width.
3. Open width, endless.
4. Pressure method on perforated spools.

Printing:
1. Yarns.
2. Slubbing.
3. Sliver.
4. Cloth.
5. Carpets.

Development Dyeing

Pliny, the elder, wrote in his Natural History an account of mordant printing and dyeing. His work was written in the first century. A short extract follows:

"There exists in Egypt a wonderful method of dyeing, the whole cloth is stained in various places not with dyestuffs but with substances which have the property of absorbing colors. These applications are not visible on the cloth, but when the pieces are dipped into a hot cauldron containing the dye the remarkable circumstance is, that though there be only one dye in the vat, yet different colors appear on the cloth which cannot afterward be removed."

"Dipped into a hot cauldron containing dye." Three thousand years and probably seven thousand years have come and gone since man first produced colored material by immersing the plain material into a hot cauldron con-

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Proceedings of the American Association of Textile Chemists and Colorists

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CALENDAR OF COMING EVENTS

Outing Mid-West Section in June.

* * *

Outing, New York Section, June 23.

* * *

Meeting, Piedmont Section, July 16.

* * *

MAY MEETING, NEW YORK SECTION

The May Meeting of the New York Section of the American Association of Textile Chemists and Colorists was held at the Chemists' Club on Friday evening, May 27th, at eight-fifteen o'clock, Vice-Chairman Henry F. Herrmann presiding.

A short business meeting was held, in which the following officers were elected for the coming year:

Henry F. Herrmann, Chairman
Ephraim Freedman, Vice-Chairman
Thomas R. Harris, Secretary
John J. Sokolinski, Treasurer.

Chairman Herrmann: This is the easiest thing I have ever done. I don't even have to change my seat. Before we become sentimental, I think we ought to get some of this business over.

It is not necessary for me to introduce the speaker of the evening. He has held the dessert to the very end. He has favored us with splendid programs all year and now we are about to get the cream, or maybe it is the demi-tasse, I don't know, I haven't heard the speech yet.

It gives me great pleasure and I feel highly honored in introducing to you the speaker on the subject "The Research Chemist Looks at Consumer Textiles," Mr. Ephraim Freedman. (Applause).

(Mr. Freedman then read a prepared paper, after which he proceeded extemporaneously from charts and notes.)

Proceedings of the American Association of Textile Chemists and Colorists

The Research Chemist Looks At Consumer Textiles*

By **EPHRAIM FREEDMAN**
Director, Bureau of Standards, R. H. Macy & Co.

IN 1928, it was my privilege to address you on the subject of "Examining Textiles from the Retailer's Point of View."

At that time, while the number of textiles examined was not great, sufficient information was obtained to warrant my offering the following suggestions:

"1—that extensive tests be carried out, covering the various factors" (i.e. weakness of material, weighting, dyes, washing, bleeding and crocking) "with the object of producing standards for materials coming under the necessity or utility class."

"2—that definitions be formulated which would convey to the purchaser accurate information—e.g., fastness of color, washing, resistance to perspiration."

"3—that materials be labeled to indicate their content."

A year later, I outlined to you "A Proposed Method of Describing Washable Materials and Garments" which method was adopted by Macy's and has since been in continuous use.

The Research Committee of this Association and Committee D-13 of the A. S. T. M. have been laboring to establish recognized methods of test for textiles, capable of permitting the textile industry to come to a better understanding of the performance, durability and utilitarian value to the ultimate consumer. The rank and file of the Textile industry, however, has failed to take advantage of the valuable information developed for its benefit and is consequently suffering most severely.

Some associations, consisting of relatively few manufacturers or individual concerns, have set up standards for their products. In most cases these standards have been of a type designed primarily to benefit the particular individual or organization and to exclude the balance of the industry.

Perhaps the case of doing business at a profit prevented the industry as a whole from realizing the sales and merchandising value of classified quality merchandise. Subsequently the industry became entangled in a falling market and the only way left to obtain business in an increasingly competitive field was to capitalize on low prices.

Quality was abandoned to its fate. Guided by lower prices and inferior quality, the industry has floundered upon the inhospitable rocks of business without a profit.

Not only has the quality of textiles been lowered, but the workmanship going into the finished product has also suffered.

During the past few years the public has been encouraged to view merchandise in terms of price appeal and through this destructive medium wholesalers and retailers have established an insistent demand for merchandise which can only be supplied at little or no profit.

It is high time that the public be educated along other lines, for its own welfare as well as for that of the industry.

How to proceed with this matter of educating the public is indeed a problem. It seems quite apparent that the textile industry must develop the courage to say "Stop! This has gone far enough. I want to be proud of what I make and I want the public to know it."

Place a seal of a recognized technical association on merchandise. This seal of merit should state the quality or grade of the article so that the public may be able properly to appraise it.

There is no dearth of tool or brains. All that is lacking is the courage and the will to do.

Already there is on foot a rather large undertaking to wean the public from its false friends and to arouse the industry from its lethargic state. We do not claim that we will not continue to make mistakes, or that this program is resulting in the elimination of all poor quality merchandise, or that it will change the complexion of things overnight. If it does nothing more than stimulate you to increase the pickage and strength of your cloth, to improve the quality of your dyeing and finishing job, or to test more of your merchandise and get to know it more intimately, we will feel that our efforts have not been in vain.

I have brought with me certain specific examples indicative of the birth of a new era of progress.

There are some tentative specifications subject to change in the light of subsequent investigations. Before I present them, permit me to add that they do not hinder the manufacture of superior articles nor do they call for a radical change in manufacturing processes.

Many of the minimum specifications I have just mentioned mean little or nothing to the public and it is not necessary to burden the public with the strength of one

* Presented at May Meeting, New York Section, May 27.

inch of warp or the number of rubs on an abrasive wheel required to cause failure of material.

Just as one now may purchase Grade "A" milk, or Grade "C" eggs, just so should it be possible to buy cloth or garments by grade. With the mind relieved of worry as to the satisfactory performance of the material, the customer will then be able to devote her undivided attention to the style value of her purchase. I feel that the establishment of these specifications strikes a responsive chord in the minds of many of us. I will, therefore, give you a brief resume of one of our experiences in our present intensive drive to make the public quality conscious.

We know that customers cannot afford to pay so much for garments as they have been paying and that they cannot afford relatively large expenditures for cleaning moderate priced garments. It will be a worthwhile contribution to the public and at the same time a step in the right direction toward restoring confidence in quality to give the public, wherever possible, washable merchandise.

I am now engaged in trying to determine what minimum loss is acceptable to the public as a normal or expected variation in color. This experiment is being conducted with the aid of the Colorscope on solid colored fabrics.

The customer is shown an original and a laundered specimen and is asked to state whether the loss in color, if any, is sufficient to make her feel dissatisfied with her purchase.

Minimum Specifications for Waterproof Materials

The term "Waterproof" shall be used only to describe such materials as withstand a hydrostatic pressure of at least 50 Cm. (19.7") without leaking.

The term "Showerproof" shall not be used except to describe merchandise which will withstand a hydrostatic pressure of at least 17 Cm. (6.7").

The term "Water Repellent" shall be used to describe merchandise not passing the waterproof or showerproof test but which has been treated to afford a greater degree of protection than would exist if it has not been treated.

Minimum Specifications for Tensile Strength

(per inch of material)

Broadcloths, cotton:.....Warp—55 lbs. Filling—20 lbs.
Crepe: .....Warp—30 lbs. Filling—18 lbs.
Blankets: .....Warp—20 lbs. Filling—10 lbs.
Voiles: .....Warp and filling not less than 15 lbs. average nor less than 10 lbs. minimum.
Chiffons: .....12 lbs. average—10 lbs. minimum.
Handkerchiefs: .....Warp-and-filling—15 lbs.
Dress Fabrics, unless otherwise described .....Warp-and/or-filling—15 lbs.
Rayons, in wet state.....Warp-and/or-filling—15 lbs.
Poplins: .....Warp—55 lbs. Filling—25 lbs.
Sheets: .....Warp—50 lbs. Filling—50 lbs.

Minimum Specifications for Bursting Strength

(Mullen Test)

Knit Rayons: .....Dry—60 lbs. Wet—40 lbs.
Glove Silks: .....Dry—60 lbs.
Novelty Knit: .....Dry—50 lbs. Wet—35 lbs.
Bathing suits: .....Men's—100 lbs.
Women's and Children's—75 lbs.
Silk and Rayon Mixtures:...Dry—60 lbs. Wet—40 lbs.

Minimum Specifications for Washability

Textiles will be described as washable by the following methods: "B", "O", or "C", if when washed according to prescribed directions they do not alter in color or appearance or shrink appreciably. No merchandise is to be described as washable if it shrinks more than 5% except in the case of knit goods where a maximum degree of 10% is permitted. The term "pre-shrunk" shall not be used if shrinkage exceeds 2%.

Minimum Specifications for Composition

The term "all wool" shall not be used to describe materials containing more than 1% fiber other than wool except for wool blankets where the term "wool" shall not be used if the blankets contain more than 2% of fiber other than wool.

The term "camel-hair" shall not be used to describe materials containing more than 3% of fiber other than camel-hair unless the other fiber is mentioned.

The term "pure dye" is not to be used in connection with silks or rayons except for such materials as are devoid of metallic weighting.

Minimum Specifications for Wearability

Woolen suitings when subjected to abrasion test on the Dennis abrasion machine involving the use of 320 metallite cloth and held under a tension of 250 grams, shall withstand at least 100 rubs in either direction.

Minimum Specifications for Fastness to Light

For dress, bedspread and similar fabrics: The term "fair" shall be applied to materials disclosing a resistance of at least 10 hours when subjected to the Fade-Ometer.

The term "fairly good" shall be used to describe those materials which withstand not less than 10 and not more than 24 hours resistance.

The term "good" shall be applied to materials withstanding at least 24 hours.

For upholstery fabrics, curtain materials, bathing suits: The term "fair" shall be used for materials withstanding 15 Fade-Ometer hours.

The term "fairly good" shall be used for materials withstanding up to 30 Fade-Ometer hours.

The term "good" shall be used for materials withstanding a minimum of 40 Fade-Ometer hours.

Minimum Specifications for Resistance to Perspiration

Materials shall not be described as being resistant to perspiration unless when kept in contact with acid or alkali perspiration solutions at body temperature for a period of 24 hours no staining occurs.

Minimum Specifications for Resistance to Sea Water

Materials shall not be described as being resistant to sea water unless when kept in contact with sea water at least 16 hours, no staining takes place.

Minimum Specifications for Bedding Materials

Down, feathers, hair, kapok, cotton and other materials used for bedding must conform to the New York State Requirements and must be labelled accordingly.

Discussion

Mr. Freedman: This investigation, by the way, is fraught with considerable difficulty, and yet I believe after we are through—and we expect to continue this investigation for the entire month of June—that we will be able to get some semblance of an idea of where we can draw a dividing line between washable and non-washable merchandise.

In the past when a converter or a dyer was called in and shown a piece of material which was judged to be not washable, a difference of opinion arose. One man's eyes or one man's mind considered merchandise washable, and the other man did not. To be able to determine the degree of loss in color is a wonderful thing, but to interpret it in terms of acceptance on the part of the public is quite another matter, and an exceedingly difficult one.

We have a colorscope in the booth arranged by Macy's Bureau of Standards on the main floor of the store and in that booth along with the colorscope, we have a demonstrator, and he takes various classes of material, original cloth and wash cloth, and he whirls them around in the colorscope and he determines the difference in color between the original and the washed specimen; then he shows the specimens to the various people coming along, both male and female. He asks whether or not in the opinion of the observer the difference in color is sufficient to warrant the customer in judging the material to be unsatisfactory.

I was down at the booth one day and along came an elderly gentleman. A lady came but from an opposite direction, and I gave her preference. I showed her two specimens of yellow material and asked her whether the difference was sufficient to warrant her in saying that the material was not washable. She didn't know.

I said: "Supposing you took this material and made it up into a skirt and a jacket and you washed one and left the other unwashed and then compared them." She said "Well, this, I would say, was not washable, and I wouldn't like it." I thanked her and then asked the old gentleman how he felt about it.

He said "Of course this is washable material. I see no difference in this." I said "Well, what would your daughter say?" He said "I have a daughter and if she said it wasn't washable, I would say she was crazy." I reminded him of course that it was the daughter that had to wear it.

Here is the interesting thing: We have conducted some tests—we expect to build these results in terms of thousands—and we find that in the case of a black which was washed that twenty women claimed a two per cent difference in color, as measured on the colorscope, difference in intensity, was not sufficient to call the material unsatisfactory, while six said it was made unsatisfactory. Sixteen men passed it as satisfactory and one man said it was bad.

With the gray, a forty-two per cent difference in color intensity resulted in an almost unanimous opinion that the material was bad. There were three women who passed it as good.

With the white, which showed no difference in color intensity, the honors were about even between good and bad, both male and female sex.

With a powder blue showing a seven per cent difference in color intensity, fifteen women passed the merchandise as being satisfactory, nine said it was bad; seven men passed it as being good and four men called it unsatisfactory.

A specimen of red material turned a little bluish after washing. It showed no difference in color intensity on the colorscope. It did show a difference, however, in the intensities of the red, the green and the blue filters, and there we found that sixteen women passed it as being good, eight as bad, and all the men passed it as being good. Either the men are not quite as sensitive to color changes or else they are not quite as particular.

That leads me to believe that possibly the dyers are not quite as particular for that reason, for the reason that they do not look at their merchandise with the eyes of a woman, because women are much more critical about changes in color than are men. This chart I have here shows it.

I have an interesting case here of a dark mauve which changed something like fourteen per cent in color. Ten women passed it as being good, five as bad; eleven men passed it as being good, five as bad. That would indicate that material of this type with so large a change in color would give rise to dissatisfaction on the part of purchasers.

There are numerous other colors on here. I am going to have this on the table, so that you can look at it later. This is by no means a complete report of the test but I brought this along merely to stimulate interest or to show you what may be developed as a result of a study of acceptance on the part of those who buy our products.

Mr. Gluck, of the Sheldon Electric Company, is also here this evening by my invitation to answer any questions you care to ask, because he is the one who has been conducting these tests under my direction.

In addition to this I brought along a couple of diverse things which I believe will interest those who are engaged in the converting or the dyeing and the weighting of silks. I want to say at the very outset that a number of people have asked me from time to time to express an opinion on the subject of lead weighting in silks. Well, I have taken the stand that it is up to those who weight silks with lead to first prove that lead weighting is harmless. We have not yet developed any information to prove that it is harmful. We are conducting numerous experiments and until those experiments are completed, no further statement on that subject will be forthcoming.

I wanted to find out what silks selling at the same price would look like after they were subjected to Fade-Ometer tests over various periods. So we took specimens of silk, chopped them up, placed them in the Fade-Ometer for hours ranging from 1 up to 144. We ran from 1 to 8 hours, each consecutive hour taking materials out and testing them and then we doubled up on the number of hours. We found that silk selling at the same price, pure dye silk, after 144 Fade-Ometer hours deteriorated about 56 per cent in the warp, 51 per cent in the filling, while weighted silks, the weighting being about 56 per cent, lost 84 per cent of its strength in the warp and 86 per cent in the filling.

We ran some tests with a less expensive weighted silk and the results were almost the same as those obtained with the more expensive weighted silk.

We also conducted a bit of research on silks selling during the past four years to find out just how they behaved or just what changes did take place. Here are some figures which may interest you. By the way, we took a count of cloth, tensile strength, bursting strength, abrasion, the finishing material, and we prepared various graphs on this subject.

I know it is quite warm and we want to have an open forum shortly and I believe there will be many questions asked, so I will skim over this rather briefly.

In so far as weight of material is concerned, we found that the cloth selling at about sixty cents a yard weighed a little over two and a half ounces. The eighty-nine cent cloth was nearly a four-ounce cloth and was almost the same as a two dollar cloth. There was very little difference between the two there in so far as weight was concerned. Cloth selling at about $2.50 a yard wasn't much heavier than cloth selling at sixty cents but it had no weighting in it. The amount of weighting, by the way, in the sixty cent cloth was considerably less than that in the cloth selling at ninety-five cents or that selling at almost two dollars a yard.

Pure dye cloth selling at about $3.50 a yard wasn't much heavier than cloth selling at $2.50 a yard. Cloth selling at almost $3.00 a yard was weighted, the amount of weighting apparently influenced the weight of the cloth so that it was a little heavier than the cloth selling at about $2.50 a yard, but there wasn't enough difference between the cloths to indicate any great superiority on the part of the $3.00 cloth.

I will go into the tensile strength of the material. The cloth selling at about sixty cents a yard was the weakest of all. The ninety-five cent cloth was second, but it was somewhat weaker than the $1.50 cloth. The $2.00 cloth was just a trifle weaker than the $1.50 cloth, very little difference between them. The cloths selling at $2.50 and $3.00 a yard were equal in strength and the cloth selling at $3.50 a yard was below that of the others.

In so far as the count of cloth is concerned, filling counts were generally low in the lower priced ranges and the cloth selling at $3.00 and $3.50 had a lower filling count than that selling at $2.50. In fact, cloth selling at $3.00 and $3.50 had a lower filling count than cloth selling at $2.00.

I make mention of these things to show that there is need for us to come to a better understanding of our merchandise, that there is need for us to label our merchandise, so that we can sell it to the customer by grade, so that the customer can pay us, (pay the industry, when I say "us"), that is what I mean, pay the industry what it is entitled to.

During the past four years, taking cloth selling at about a dollar, we find that values have increased. For cloth selling at a little over a dollar, there has been a decrease in value. Maybe that is why the public prefers buying cheaper cloth. For cloth selling at about a dollar and a half, again we have an increase. For cloth selling between a dollar and a half and $2.00, the count of the cloth in so far as the filling is concerned, is about the same, the tensile strength of the filling is about the same, but we have put more in the warp of the cloth. Remember, please, that a chain is as strong as its weakest link and the weakest link there, is the filling.

For cloth selling at about $2.00, there again we have a rise in the warp, but in so far as the serviceability of the cloth is concerned, the picture is far from being encouraging.

When it comes to cloth selling at about $2.50, there we see very little difference except in the tensile strength of the warp which has gone up. That may account for some expressions of opinion on the part of some of the laity when they say that they cannot buy merchandise

in the higher priced range and find it as satisfactory as they did heretofore. That may be true because there is not so great a demand for it and that the amount produced is small and the cost of the overhead involved in the cost of production is increased. However, these few examples that I have tried to show you are an indication of what we expect to find as we delve into something over fifty thousand specimens.

We are engaged in this investigation at the present time. We are trying to find out what is the trend of materials and to find out just what has happened to materials during the past five years. I think if each and every one of us sits back and gives this matter serious attention, we will find that our only salvation lies in knowing our merchandise more intimately and in labeling our merchandise truthfully so that we can sell that type of merchandise which is worth while at a profit.

I thank you. (Applause.)

Chairman Herrmann: Gentlemen, I am sure that we have all heard a very able discussion and by a person who is well posted and competent to discuss the subject.

We who are gathered here tonight represent a pretty fair cross-section of this vast industry known as the textile industry, and undoubtedly the remarks of Mr. Freedman probably touch all of us in a slightly different way and hit us in a different manner. Some of us may be pleased and some of us may be slightly disappointed. This year the Association more so than before has devoted a large portion of its program space to the discussion and contemplation of consumer problems and it is no more than fitting that we should have wound up the season with a spokesman whom we may recognize as ably representing the consumer point of view.

There are probably many of us here who back the old gentleman and some of us may think the old lady was right about the samples that they differed on. Every able speaker hands out only about fifty per cent on his presentation and has at least fifty per cent back there waiting for his listeners to draw it out. Mr. Freedman is anxious to develop any of these many points and he has sowed the seeds, I am sure, for very much thought. I would like to call on you to ask just as many questions as you think you would like to have answered, at least to get Mr. Freedman's point of view on it. Let's make this discussion just as informal as possible.

Also, I would say that we don't have to limit the Forum to questions. If somebody feels that he has another answer to a question that has been propounded or if his answer is somewhat at variance with that of the speaker, let's have the answer. Maybe we will get a few debates around here.

Mr. C. H. A. K. White: I most heartily have to agree with Mr. Freedman's point of view in saying that dyers are not as particular as women are. However, I would like to change the sentence a bit: They cannot be as particular as women are for the simple reason that nowadays conditions as a whole in the textile industry are such that one cannot be as particular as he was three years ago.

I am a dyer myself so I know the point of view of the dyer. Many times I hear complaints of a dyer not being as alert as they used to be. That is natural. A year has made a difference of fifty per cent in production. For instance, in 1930 my concern had approximately thirty per cent less work than in 1931 but we made a profit. In 1931 with a 30 per cent increase in production we had a tremendous loss.

Why happened this? It seems to me it is this: The women say they are going after cheaper merchandise, and naturally the jobbers and converters are hard pressed and naturally they not only cut down on the purchase price of the rayon but on the dyer also. When it comes to the dyer, he cannot give a five cent a yard job for two and a half. He has to cut out certain processes and put in cheaper processes. What happens? General dissatisfaction all around. Of course when it comes to the dyer, he dares not say anything, he finds it is not wise to. What happens, there is a general dissatisfaction with the colors and the fastness of the properties all around the trade. If this thing could be eliminated, a dyer could give better time to it also.

I know the tendency in dyeing rayon. Whereas four years ago I used to dye rayon in an easy way, two hands on the jig gave a fine job, evenness, nowadays I have to take six hands before I get the proper penetration. That shows you right there what a dyer has to cope with all around in his work. Therefore, you know it isn't that the dyer is not particular, he cannot be particular. It is absolutely out of the question.

I see here in New York City one dye-house after another closing down. The result is this: Dyers compete among themselves. Today I hear of rayon crepe being dyed for three cents a yard and tomorrow another fellow turns around and does the same thing for two and three-quarters. If we have to get the business, we have to go to two and a half and bye and bye we are going to pay for the dyeing of it instead of gettting pay for it. Naturally, you can't expect that we should turn out the same type of job.

Also, I remember in 1930 we used to refuse for eight cents a yard to develop colors for printing purposes. In 1931 we did the same job for four cents a yard. We didn't take it for eight in 1930 but we were compelled to do it in 1931. Now we have cut them out altogether.

I am very glad if I can say just a few words in behalf of the dyer also. (Applause.)

Chairman Herrmann: Well, that is the dyer's point of view. Some of us have heard it before. There was a

word that Mr. Freedman used, "sensitive." It signifies a lot. The eye is sensitive. The Frenchman uses the term "sensible" instead of sensitive. He says a balance is sensible if it tips very easily. The English change the meaning of the word around and call it sensible. I suppose it is a question of deciding between sensible (san-see-bul) and sensible. That is another point of view.

There are other remarks, I hope.

Mr. Peter Fiebiger: I would like to ask Mr. Freedman who adopted these standards. I notice the standards on the tensile strength of dress goods is low. We always consider if we are turning out merchandise with only eighteen pounds per square inch that we are getting the merchandise back. Ninety per cent of the time we will get the merchandise back. Our standard has to be between twenty and twenty-five. Naturally, you will find that merchandise having a strength of twenty and another piece of merchandise having a strength of 27 will feel under the thumb test. The higher strengths will be weaker under the thumb and the low strengths will be stronger. That depends entirely upon the construction of the merchandise. If your merchandise slips easily and the thumb cannot get a hold, the buyer, the woman, will regard it as strong. In fact, it is weak, but if it doesn't give way before the pull is applied, though it might be very strong under the machine, it will be regarded as weak.

I am wondering how Mr. Freedman can tell us of his experience if the buyer is applying this test or if he relies entirely on the Bureau of Standards or on the official tests made by the Bureau of Standards of the corporation.

Mr. Freedman: Well, if you will recall, I remarked before that these were minimum standards, not maximum ones. They were minimum standards. These standards that I quoted are not necessarily the standards for silks. As I mentioned before, we have such things as voiles, chiffons and nets. You have some light-weight cotton goods for children's dresses that don't require twenty or twenty-five pounds of tensile strength in the filling. I merely gathered together some minimum standards for some materials.

Some of you may remember that a month or so ago I remarked upon examining two specimens of weighted silk, one of which had an initial tensile strength in the filling of over 21 pounds and another specimen that had a minimum tensile strength in the filling of a little over 15 pounds, that after a 24-hour Fade-Ometer test, the material having a tensile strength of 22 pounds had dropped to five and a fraction pounds while the other was still over ten or around eleven pounds. That indicated that if you want to rely merely upon tensile strength alone, it is not sufficient. The initial strength that you make mention of of 20 pounds is not sufficient if you do not take other things into consideration.

Does that answer your question on this?

Mr. Fiebiger: If you would kindly answer the second part, I shall be glad. I was wondering how the woman is judging the tensile strength, if she is making it with her thumb of if she is relying on your specifications.

Mr. Freedman: Unfortunately, not many women use their thumbs to test materials for strength. They rely upon our specifications. We set our specifications for the particular type of material, and we take into consideration the price of the material and the relative strength of other materials at that price and at surrounding prices, so that minimum standards that are set up are set up around what the market affords. The mere fact that the minimum standard is set up doesn't mean that all material should have that tensile strength. Far from it. Go as high as you like, produce as strong a material as you care to, the stronger the better, but at least let us set a line and beyond that line we will not go. We won't go any weaker than that. This is merely a starting point, as I also remarked before, and it is subject to change in the light of further developments.

Mr. George L. Baxter: Mr. Freedman, you said under the specifications that could be labeled "pre-shrunk" that you allowed for two per cent shrinkage. Did you mean by that warp and filling?

Mr. Freedman: Yes, Mr. Baxter, I mean warp and filling there. I do not believe in the use of absolute terms. I do not believe we ought to call anything non-shrinkable or "100 per cent shrink-proof" or anything like that. I believe that when material is referred to as pre-shrunk, the material should be described as such only after a laboratory test under prescribed conditions, because you and I and many of us know that depending upon the method of handling the material, we may be able to obtain a greater shrinkage or on the other hand even stretch, and that should hold good in either direction.

Mr. Baxter: The reason I bring up this point, the average shirting material today is woven 37 to 37½ inches in the grey. The average shirt manufacturer has his patterns laid out at 35 inches and will refuse to cut any goods that come in under 35. The result is that in many cases, it is out of the question for the finisher to finish the goods and hold them out to the 35 inches required and leave only two per cent shrinkage in the filling, so that I believe at least eighty per cent of your shirting material today, if not ninety, shrinks more than two per cent in the filling, and that has generally been disregarded because of the fact that your shirtings are all cut warp-wise and they allow much extra in the filling.

It is a small point and I realize that what you are doing is setting just the groundwork. There are so many interesting kinks of that kind that may come up in connection with it. I thought maybe that might be one.

Mr. Freedman: I will say that we have been specifying preshrunk materials in our shirts.

Mr. Baxter: Have you been allowing for over two per cent in your filling?

Mr. Freedman: No, two per cent in either filling or warp, either direction.

Chairman Herrmann: I don't know what two per cent looks like in a shirt but I know what it feels like. It is probably the difference between a sixteen collar and a fourteen.

Mr. Baxter: A difference between a sixteen and a fifteen and three-quarters.

Chairman Herrmann: Then that is more than two per cent, I can tell you that. Some of our very best shirt manufacturers will produce and call it pre-shrunk, either that or I am expanding daily.

Mr. Baxter: The finish in a shirt which is not preshrunk will run up as high as three and a half or four per cent. We tested some that ran over five, as far as that is concerned, that is without any shrinkage treatment of any kind whatsoever. In the natural stretch put in the cloth in finishing, there will be from three and a half to five per cent. In fact, on some broadcloths, the finisher has been required to give five per cent gain which means a six or seven per cent stretch.

Mr. Freedman: I agree with you, Mr. Baxter. That happens frequently but we don't accept it as pre-shrunk.

Chairman Herrmann: I would like to ask a question myself, if I may be permitted. Mr. Freedman, I thought the fastness to light specifications were very generous, that is, a ten hour Fade-Ometer test was very easy, and 20 and 25 hours I would consider very easy. By contrast the washing tests are very severe, that is, if you wash your material and then have to put it into a machine and get a mechanical eye to look at the change, why, it is pretty tough. The Research Committee of the National Association, the national body, has been struggling to get an agreement between the different factions, different members of the organization, different bodies that they represent, on proper classifications, that is, loss in depth as contrasted with a change in hue, that is, a loss in shade as compared with a change in hue.

There is many a color that is rated as being fast to washing that may change an iota but it won't stain anything, and after the first washing, it won't go much worse, and I would like to say, too, about washing one portion of a garment and then comparing it or contrasting it with the unwashed portion of the same garment, that is also kind of tough. I have never yet found that one could take a yard of any material and cut in half and do anything with the one-half that you didn't do with the other half and put them together and have them look alike. Then if you show them to an old man or an old lady, somebody is going to see a difference.

In a constructive light, I would like to ask whether the fastness to washing requirements are so very severe that one must judge every slight change in hue visible to the eye or visible to the scientific, mechanical eye, whether that type of fastness harmonizes with ten, fifteen, twenty or twenty-five hour Fade-Ometer tests, which as I said before are by contrast extremely lax, considering the fact that the dye manufacturers are able to deliver so many dyes that run in the seventy-five hour class. I wouldn't say that we have them for all materials but they are available for many, many styles of fabrics.

Mr. Freedman: Well, Mr. Herrmann, I believe there is just a little misunderstanding about this. When I referred to what you called the mechanical eye, the colorscope, I believe I made it clear that we were using that as a medium through which we were seeking light in what percentage difference in color intensity causes customers to say this is satisfactory and this is not. We have for the past five years determined without the aid of any instrument what in our judgment was satisfactory merchandise and what was not. As I remarked before, there are others who disagree with us. We, being technical and those on the wholesale end being technical, we have decided to let our opinions go by the board and find out what the person who is buying the merchandise feels about it, and then see if we could tackle this problem from another angle.

If we can do that, if we can find, for example, that ninety per cent of the people, or ninety-five per cent, let us say, or maybe ninety-eight per cent of customers, will say that a particular variation in color, a particular percentage of loss in color, is sufficient to cause an article to be unsatisfactory, that is the dividing line for it. That is the reason for our using the colorscope. We are not trying to tell the customer or to tell anyone else that because a specimen loses ten per cent or one-tenth of one per cent that it is satisfactory or otherwise.

In so far as the standards for the Fade-Ometer are concerned, not so long ago I had occasion to see the report of a laboratory which was made out on behalf of a manufacturer of silks and that report stated that the silk was placed in the Fade-Ometer and kept there for ten hours, no fading was noticed, the goods therefore were sun-fast and compared very favorably with the best merchandise on the market. Laugh that one off!

Just yesterday I had a manufacturer of bathing suit material in my office and he brought the dyer along. I showed him certain specimens of woolens that showed noticeable fading when subjected to Fade-Ometer light for less than twenty hours. This is really a serious matter, these are some bright shades that the ladies want, they are going to wear them down at the beaches all summer long. Twenty Fade-Ometer hours is supposed to be equivalent to about 26 or 27 sunlight hours, taken at noon

during the months registering from May to August or September, and so one could expect a great deal of satisfaction with a good many of these bathing suits, but we haven't been able to find on the market bathing suit materials in yellows, greens, powder blues, and some of the other colors that will resist even twenty hours' exposure to the Fade-Ometer. There is a demand for that material. I have invited numerous dyers to submit merchandise which would pass a more rigid test. So far they have been unable to do so. There is a demand for the material and it appears quite essential that material of that type be sold.

A minimum standard should be set up. That is what we have done. We have set up a minimum standard, inviting everybody to come in on it. As soon as better merchandise is available, the standard should be raised, the minimum specifications should be raised. I think the dyestuff people themselves can do much toward educating the public to a better understanding of the behavior of material, not alone to washing but also to sunlight, by producing color cards, stating in terms of artificial sunlight, Fade-Ometer hours, if you choose, the resistance of that material and then if that material can be graded accordingly, those who buy the material can govern themselves accordingly.

Chairman Herrmann: Thank you, Mr. Freedman. I suppose the Almighty Dollar dictates the quality. I think Mr. Freedman's point is entirely correct in his answer that he has to be as tolerant as the materials offered to him, and if he makes his tests stiff enough, his minimum requirements too stiff, he won't have any merchandise to sell.

Well, as we live, we learn. I would like to hear some more questions.

Mr. Freedman: Mr. Herrmann, I would like to say this: Last November we tested something like 76 specimens of cloths and we found that most of them were stained during the washing process and they all were affected by alkali perspiration.

Two months ago we were honored with the presentation of papers by Dr. Pierce of the Ciba Company and Mr. Stott of the DuPont Company. I brought up this very subject. Shortly thereafter I invited a representative of a dyestuff concern to come to my office and I invited the manufacturer of the hose or the mill agent, to be more specific, to come down. I had the buyer there, and I asked them to see whether they couldn't clear up this situation, because in my opinion the public was entitled to better merchandise. The dyestuff man took paper and pencil and he said it would cost less than a quarter of a cent per pair of hose to give you satisfactory merchandise, and the trouble was not with the dyestuff but rather with the treatment of the hose in the mill or rather in the dye-house. He and the mill agent promised to get together and straighten this thing out. The matter of price was settled. There wasn't going to be any controversy about paying any increased price.

A month and a half went by. I saw neither hide nor hair of either of them. I finally got the dyestuff man on the wire. I know him fairly well. I am afraid my language to him was a little strong but he said that he wasn't getting cooperation from the other fellow, with the result that I had to talk to one and then talk to the other and only this afternoon was there placed on my desk some dyed hose and some undyed hose. The dyed hose, by the way, were coming from our own stock, the undyed hose from the mill agent, so that the dyer can go ahead and show us what he can do. What I told this dyestuff man was this: "I realize that you are afraid of losing your business with the dyer if you don't do as he tells you, but I also tell you this, that if we don't get cooperation you may lose your business with the dyer because we may change our source of supply of hosiery," and that may be the reason why the hose is now reposing on my desk. This was not a question of price. As I understand it, it was a question of shortsightedness on the part of the man who was doing the dyeing. I hope that is where the trouble rests and I hope it will be cleared up shortly.

Mr. P. J. Wood: Mr. Chairman, with regard to these tests, I don't know just how reliable the wash tests are. You remember at the annual meeting we had a doctor there who told us about the incidents of color blindness and strange to say, he found a great deal of color blindness among dyers. (Laughter.) Another thing he told us, if my memory is not faulty, is that color blindness is not so common among women as it is among men. That might account for the fact that the men on your jury appeared to be more lenient than the women.

I think your tests would have more value if alongside your demonstration booth of the color testing machine you would also have an eye testing machine and have an expert installed there to pass on the color blindness or otherwise of the jury. (Laughter.)

Mr. Freedman: Mr. Wood, that may sound very humorous to some but the fact remains that we intend seriously doing that and permitting only those to pass judgment on specimens who pass the color blindness test.

Mr. Wood: Instead of having the general public pass on these serious questions, it might be well to appoint a committee from your own staff having color tested eyes, composed of both men and women. I think that would add to the value of your tests.

Of course there is another thing to be remembered, and that is that it is not only a question of correct perception but a question of disposition. There might be some on your jury that are not very willing to serve, as many jurymen are not, I am told, and they might be a little bit huffy about being asked to act.

I think your illustration of the lady you spoke of was hardly an apt one, if you don't mind a word of criticism, because as Mr. Herrmann says, it is not fair for the coat to be washed and the trousers not and expect them to match. That is really a very severe form of test. We have to remember this, that not only does the washing affect the color but it affects the physical appearance of the fabric. I remember only a week ago that we had some goods that were a little chafe-marked and some enterprising young fellow had mentioned to one of our staff that they had a sure-fire chaff eradicator. I never saw one, maybe others of you know all about it. I said, "Well, I don't know. I never saw one yet but we will try it." It did do something to the goods but when we came to clean out a few dirt spots, we found when the spots were cleaned, there were marks that couldn't be removed without taking out all the chaff eradicator which was evidently some kind of an oil finish. There is no doubt the washing affects the physical appearance of goods and while that might not confuse your automatic eye, it would certainly confuse the human eye, and in any test of this sort, I think you have to take due cognizance of that fact.

In fact, I think I can perceive it on some of these samples, because it seems to me that some of them—I picked out one the old gentleman wouldn't condemn and I wouldn't condemn it either, but of course I am a dyer and I wouldn't be expected to.

I agree with this first speaker who said that the dyers are really not given a fair break today. I think we are all agreed on that point. I think he brought the lesson home very forcefully to us that if we had more time, we would do what we ought to do. When one is driven to the extreme of making print deliveries in—shall we say three days, Doctor?—when a dye delivery of a week or ten days was considered very good, and now a print delivery of three days is rather cavilled at, we know that we cannot give the same minute attention that we have in the past. That undoubtedly has led to a break-down in the quality of merchandise, as much as we would like to have it otherwise. The economic question has entered into the matter very, very forcibly.

I do think you are to be complimented on the thorough way in which you are going into this matter and wish you success in accomplishing what you have set out to do.

Mr. Freedman: Thank you, Mr. Wood.

Mr. Kennedy: You mentioned that your laboratory is now undertaking a study of silk weighted with sugar of lead. Can you furnish us with an expression of opinion of your buyers? Are you at liberty to do that?

Mr. Freedman: No, I would rather not.

Mr. Kennedy: Will your store accept that merchandise now?

Mr. Freedman: It will not, knowingly.

Mr. Wood remarked about the economic situation. That is a very unfortunate situation, to say the least, but I feel that if each of us in our way goes about trying to get the other fellow to see that selling merchandise or selling our methods of dyeing on the basis of quality rather than price, selling the finished material on the basis of quality rather than price, if we ourselves do our work in that way, some good is bound to result.

Mr. Wood: You are quite right but it is rather an uphill job at the present time, because we have among our customers a great many people who look only at price evidently. We find that by the type of competition with which we are confronted. It was only last week we had a customer who complained about some goods, he said, "You made them too good. We deal with the three seventy-five houses. We want them not so silky as that, we want them rougher."

Mr. Frederick W. Stanton: I have heard a lot of talk from the different consumers or the people who sell to consumers about what the dyer does and the printer does and what he doesn't do. I wonder if those same ones have ever been in a department store and asked the sales people what the material was that they were selling and found out how poorly educated the sales people were who really have to deal with the customer. I wager you can go into the dress department of a first-class department store and you wouldn't find one out of ten girls who could tell whether that piece of silk was weighted or true pure silk or whether it was rayon. Nine times out of ten she would tell you that rayon was silk or Celanese is rayon or vice versa. I think the stores can go a long way in educating their own help in being able to give you a truthful account of the different fabrics which they have on sale.

I have found them to have an utter lack of knowledge of what they are selling, what the material is they are selling. They have no conception of what is silk, Celanese, rayon or what. If you say "artificial fiber," they won't know. Nine times out of ten, they would say "No, that is silk."

Mr. Freedman: Mr. Stanton, I am afraid you are grossly misinformed in so far as my own organization is concerned, because we have signs over the counters referring to silk on the counters as pure dyed silk. We go further than that. We are not using the terms "all-silk" or "pure silk" for weighted silk. We are using the terms "pure dye silk" and "all silk" only for silk that is devoid of metallic weighting.

I doubt very much if you went into the store that you would find any sales clerk who would make such a statement. Surely, if she made such a statement, she would do it without any authority and she would do it with the knowledge that she was doing something wrong, because they are informed. They are also informed as to whether or not the merchandise is washable, because washable merchandise bears a tag, our guarantee that the merchan-

dise is washable, and if it contains any fibre other than silk, then that is stated.

As a matter of fact, the silk department does not sell any material other than silk. We have a rayon department and we have a cotton goods department. If I am wrong, Mr. Collin will correct me. If our silk department does have anything of silk and rayon, that merchandise is kept on a separate counter and the clerk there is conversant with that material. That also holds good for dresses that are sold.

Mr. Stanton: How do you account for printing displayed back up?

Mr. Freedman: What do you mean "back up?"

Mr. Stanton: The back of the goods instead of the face. All prints have a face and back.

Mr. Freedman: I haven't seen any of that.

Mr. Stanton: I will drop in and show you. You will find it habitually in certain good stores.

Mr. J. W. Collin: That is quite possible. Merchandise is rolled and placed on a counter. It is handled several hundred times before it is sold to a customer. In some instances we may transfer a counter from here over there. You understand it collects a certain amount of soil. Soil shows first at the edges of the material, so a person who is the least bit careful when she buys material, will find a soil mark down where the folds are. It has been a subject of discussion several times as to whether we should roll the material with the wrong side out. When a customer wishes to see it, we open the folded end and show her a yard or a yard and a half. It seems like a sensible thing to me. I don't know whether you people agree with me. It sounds logical to me. There may be a time in the business when we will come to that. Particularly on prints that would be very desirable.

Mr. Stanton: I mean on display, where you have it hung up on a stand.

Mr. Collin: Then that would be just a case of an error.

Mr. Stanton: That is what makes me think they don't know their merchandise. I am sure of that.

Another thing I would like to ask is this: Why would they sell dresses with one sleeve made wrong side to? Don't tell me I haven't seen them because I can take you down to ——— Store and show you, if you want to go.

Mr. Freedman: I don't doubt but that is likely to happen, and I think if you saw anything like that and you had any sort of brotherly feeling about it, you would have called somebody's attention to it.

Mr. Stanton: I showed it to the buyer.

Mr. Freedman: What did he say?

Mr. Stanton: He said it was first quality merchandise but it stood on the rack just the same. That happened last spring in the basement of that store. I was there and wondered at the time. Being in the basement, I thought they were seconds, and to be sure, I asked. That is only referring to prints of course.

Mr. Collin: You technical people are not aware of the vast amount spent by retail businesses, particularly our own store, in examination. On every article brought into our store, particularly, ready-to-wear, we have one hundred per cent examination. That merchandise is placed on a bar in a clear, well-lighted (by daylight) area. The garment is examined inside and outside to meet our specifications. If there is a mar, blemish, drop-stitch or any kind of mark at all on the dress, it is condemned and sent back. Recently, as Mr. Freedman can verify, I have been called in a great many times by wholesalers who say we condemn too much merchandise.

We have a list of vendors, well-known manufacturers in the metropolitan area, whom it has been necessary during the last four or five months to interview, not only the merchandise counsellor but other people, where the men say they wish to discontinue business with us because we return too much merchandise. Our specifications and examinations are too strenuous and too strict.

We don't say we are one hundred per cent perfect because we are not. It is quite possible that a dress or garment can get into stock with the sleeve wrong side out. It can happen in any store, because you are dealing entirely with the human element of examination. Our examiners are trained to a certain degree and are even penalized for passing merchandise. We can take a garment from stock which any of us may discover to be damaged, we can trace that particular garment back to a particular shipment, and further than that we can trace it to a particular examiner who passed it. If you want any more system than that, we will go into further details. You can't ask for more than that. We spend hundreds of thousands of dollars a year to protect our customers. To examine merchandise properly, you can't ask us to do more than that. That is what we are doing. We examine several hundred thousand garments. Some place along the line, say at five thirty in the afternoon perhaps a girl does let one slip by. We can't hang her for that. We do know if she examined fifteen hundred other pieces that day, the rest of them are all right.

Mr. White: To my mind Celanese seems to be a happy medium among all the fibres. There are only two ways of dyeing it, either bad or good. You either dye it fast or it is not fast at all. If it is uneven, you can plainly see very well. This is about the only fibre that is not touched so much by the depression. With Celanese, no matter how much you rush the dyeing part of it, it won't pick up the dyeing fast enough. As far as unevenness is concerned, it is plainly visible right away unless you do it absolutely even.

Mr. Freedman: I think, generally speaking, you are quite correct.

Chairman Herrmann: Are there any more questions, gentlemen?

A Member: You can have material dyed by a respon-

sible dyer and you know you are going to get what you specify. You can buy from responsible houses and know what you are buying, ninety-nine per cent out of a hundred. However, in this day when price is paramount, the retailer may advertise "Silk dresses, $5.00," and "Silk dresses, $50.00." One may be pure dye silk and the fact isn't mentioned. Mr. Freedman said his store was informed. That is the only store that I know of that is. My wife goes shopping and she makes it a point to ask and she has been in practically every store in New York and she has never received an answer from the salesperson that she knew what was in the dress, whether that was a $5.00 or $50.00 item. I think the retailer can do a whole lot to remedy that. If it is pure dye, put a big sign on it; if it is weighted, say so. The retailers can do more than anyone else along that line, if they want the public to be informed.

Mr. Freedman: I believe you are quite correct about that, but here is the proposition in so far as dresses are concerned. A buyer goes out into the market and buys a lot of dresses and he buys them from the style angle. They look quite good to him. He gets them into the store and they are examined for workmanship. Some of them may be tested so far as materials are concerned. You might have pure dye and weighted silks in the same lot, and it is impossible to test each and every dress in that lot. It is exceedingly impractical to say the least, but if that merchandise were labeled from the very source, and were graded, as I proposed before, then it wouldn't be necessary for anyone to be misinformed, because a garment made of the weighted silk would bear a label to that effect, put on by the manufacturer of the garment, and he would have as his authority to do so the information given to him by the man who sold him the goods as weighted silk.

You can't expect the sales clerk to know whether a piece of silk is weighted or not. She may have some idea about it, but that is all unless that garment is marked. That is why it is my opinion that the grading of materials, the labeling of materials should start at the source, so that those along the line who are not endowed with the technical knowledge that we are supposed to have can properly describe the merchandise.

Mr. Arthur F. Wiehl: The making of dresses at home is going out but what would they think of the labeling of merchandise? What does the cutter-up think of it?

Mr. Freedman: I don't know what they think of it other than that they have as an alibi that they don't always know things. Aside from that, I see one way of tackling the proposition, and that is by arousing public demand for the correct labeling of merchandise and then for those of us at the other end of the works—I refer to those in the production end—to see that our merchandise is correctly labeled. Then, if the man anywhere in between, be he cutter-up or retailer, is negligent, the responsibility is his, but at least you will be able to place your finger where the responsibility belongs. At the present time, we are still engaged in the glorious pastime of passing the buck.

Chairman Herrmann: Gentlemen, the hour is getting late—

Mr. Baxter: I was going to answer Mr. Wiehl's question. Probably the cutter-up or manufacturer thinks the same as any of the others of us do. We each have our problems, we are each passing something on to the other fellow, but every effort that is being made—such as the constructive effort that Mr. Freedman has told us about tonight—is helping somewhat to improve the whole general picture.

During the past week I was quoting a customer of mine on finishing certain goods and he said "Those goods are going to a certain firm"—he mentioned a big wholesale house, and he said "They have got to pass the test." I said "That is fine, that is the type of work we want, because we know in this particular case none of our competitors can come in here and underquote us with the idea that they are going to shove something over by mixing color and work that is not up to standard and get by."

The more constructive efforts that are made to establish things in the way Mr. Freedman has told us about, the better position we are all going to be in.

Mr. Freedman: In confirmation of what you have just said, a dyer called me on the wire the early part of this week, and he said, "What are your washability requirements?" He went on to say, "the reason I ask is that a man says that he cannot sell Macy unless the particular merchandise they want is washable and he has written across his purchase order, 'Must pass Macy's washability requirements'."

Chairman Herrmann: I think it was exceedingly kind of Mr. Freedman to have given us this talk and to have spent the time on it to work up this immense amount of detail that he has presented. Some of us happen to know just a little of the arduous labors that he has been performing in doing this special work, and for the sake of the record, I would like to say that a man coming from such a powerful institution and talking on such a subject is apt to draw a little fire, not directed at him and not directed against the organization that he represents. We wish to consider any remarks that might appear somewhat critical, because some names have been mentioned, to apply to the retailer in general rather than to any organization in particular. It would be most unfortunate if any other impression were left, because I think we are all of one mind that this particular organization is one of the finest and one of the most scientifically controlled and directed that we are favored with in this district.

Before we close, I would like to run over a few little details that I omitted previously in order not to delay the speaker.

. . . Chairman Herrmann made various announcements as to committees and the next meeting. . . .

Chairman Herrmann: One further word, in behalf of the officers that were elected tonight. I wish to thank you for the honor that you have accorded us. Personally, I feel that it is a bid for a lot of responsibility on our part possibly. I will take my share of it but I am going to pass on about ninety per cent back to the members in this form: This is your organization. It is a family affair. You are not going to get any more out of it than you put into it. We are going to have some lively committees around here and I would like to ask that every member who is requested to serve on a committee accept the responsibility in the spirit in which it is offered to him and do his little share so that we will have a bigger and better Section or at least that we will carry on the good work that has preceded.

On the matter of programs, it is a difficult subject and it is hard work for the Chairman of the Committee. Mr. Freedman is sitting behind me. He has had it for a whole year. That is one committee that possibly needs your support more than any other. I don't know yet just how we are going to work that next year, but I ask all of you gentlemen to support whoever takes the duty on his shoulders. If you are able to make his task lighter, you will be doing it for yourselves. You are coming to meetings anyway, they might as well be good meetings.

I wish to make another suggestion and that is I would like to see a greater participation on the part of the members in our programs. It has more or less fallen by the wayside in the last year or so to have members prepare papers. I think there is nothing finer than to have one of our own group lead off in the discussion on something that is essentially his and ours. We can get outsiders to speak, and we have done a lot of it with a particular purpose, but I think we are going to swing the programs back now a little more into the technical vein, and we would like to get participation on the part of the individual members.

Mr. Freedman passed some charts around and would be very grateful to you if any of you have them to see that they are put into some safe place where they can be easily picked up afterwards.

If there is no other business before the house, I would like to call for a motion for a rising vote of thanks to Mr. Freedman.

Mr. Wood: I so move.

. . . The motion was duly seconded, put to a vote and carried, as the members rose amid applause. . . .

. . . Whereupon, at ten o'clock, the meeting adjourned. . . .

The Isoelectric Point of Wool

By **MILTON HARRIS**

Research Associate of the American Association of Textile Chemists and Colorists.

Suspensions of solvent - extracted Idaho and Australian raw wool and of scoured worsted cloth in buffer solutions of different pH were prepared by grinding the dry wool to a fine powder and shaking the powder in the buffer solution. Electrophoretic measurements of these suspensions gave an isoelectric point for each wool at pH 3.4.

The samples were slightly different in nitrogen content. If this is indicative of a difference in structure of the wool, the results indicate that the isoelectric point is very slightly or not at all affected by small differences in constitution.

The theory and application of electrophoresis measurements to suspensions of wool are discussed.

I. Introduction

THE application of physical chemical methods to studies of wool should make it possible to understand better the complex character of this protein as well as offer a means of determining any changes taking place during chemical processing.

Since wool is amphoteric, that is, is capable of ionizing both as an acid and a base, it follows that a study of its acidic and basic nature is of practical as well as theoretical importance. Amphoteric substances are positively charged in acid solution and negatively charged in alkaline solution. The hydrogen ion concentration of a solution in which the ionization of the acid groups of the ampholyte is equal to the ionization of the basic groups is known as the isoelectric point. That is, at this point the concentration of the cations of the ampholyte equals the concentration of the anions and the sum of their concentrations is a minimum.

A study of the isoelectric reaction of the wool protein is of importance at this time since more stress is being applied to utilization of pH control in wool processing and also because the values of the isoelectric point found by other workers are not in agreement.

It has been shown that it is necessary to control the pH in the treatment of wool during manufacturing processes. Solomone[1] has pointed out that there are optimum pH values for the scouring, oiling, bleaching and dyeing of wool. A specific example is brought out in the chlorination of wool. If this opera-

tion is carried out in the isoelectric region, the attack of the fibers is reduced to a minimum.

The isoelectric point has been reported as low as pH 3.4 and as high as pH 4.8. Meunier and Rey[2] determined the point of minimum swelling of wool fibers immersed in buffer solutions of varying pH and found the isoelectric point at pH 3.6 to pH 3.8. Marston[3] investigated the amount of acid bound in the region of the isoelectric point. By extrapolating the curve relating the amount of acid bound with the pH of the reactive system, he found that the point at which no acid is bound exists in the region of pH 3.4. Speakman[4] treated samples of wool with standard potassium ferrocyanide solutions of known pH. After 24 hours the wool was removed and carefully washed to remove uncombined ferrocyanide and then immersed in ferric chloride solution. By this procedure he found that when the pH was high no combination with the ferrocyanide ion occurred; at pH 4.8 combination began and thereafter the amount of Prussian Blue formed increased as the pH decreased. He concluded from this that the isoelectric point of wool is in the neighborhood of pH 4.8.

A number of methods are available for the determination of the isoelectric point of protein but the applicability of any specific method depends largely on the nature of the protein in question. These methods are based on the fact that at the isoelectric point, the osmotic pressure, viscosity, amount of alcohol required for precipitation, conductivity, swelling, and migration in an electric field are all a minimum.

The insolubility of wool in ordinary solvents has limited the number of these methods which can be used in studying this material. Since microscopic suspensions of wool are easily prepared, it is possible to study the migrations of the particles in an electric field. The movement of small particles suspended in a liquid in which a potential difference between two electrodes has been set up is known as electrophoresis.

II. Apparatus and Methods

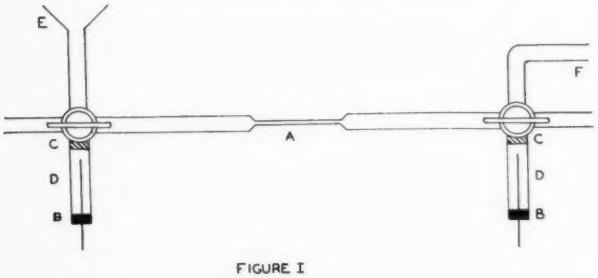

FIGURE I

Electrophoresis Cell

The electrophoresis cell (Figure I) employed in this work is similar to the one described by Northrup[5] and is exactly like the one used by Abramson[6]. A is made of fused glass with approximate dimensions as follows: Length 3.5 cm., width 1 cm., and thickness 0.055 cm. The diameter of the connecting side tubes is large in comparison with the thickness of the cell. The electrodes D D are non-polarizable and composed of $Cu/CuSO_4/CaSO_4 .2H_2O$. Sat KCl/. C C are porous plugs prepared as follows: Powdered gypsum is put into the electrode vessels, sufficient water added and the mixture is allowed to dry and harden for several hours. The apparatus is filled with saturated potassium chloride solution and allowed to stand until the pores of the plaster of Paris plugs are saturated with electrolyte.

The stopcocks are turned so that A is open to E and F. The suspension to be studied is poured into E and both stopcocks turned so that A is open to D D. The apparatus is placed on the platform of a microscope and a direct current of 220 volts is applied to the electrodes. The current is reversed by means of a commutator. The microscope is equipped with an 8 mm. objective and a 6X eyepiece. The eyepiece contains a scale which covers .34 mm. on the objective.

The electrophoretic velocity (see section III) was measured in each direction and an average of ten readings was taken.

In the determination of the isoelectric point, three samples of wool were used; namely, raw Idaho wool, raw Australian wool, and wool from a piece of worsted cloth which had not been carbonized. The wool grease and dirt were removed from the raw wool by successive extractions with Stoddard solvent (boiling range 150°-200° C.), alcohol and ether until no appreciable residue was obtained on evaporation of the solvent. The worsted cloth was scoured in a half per cent soap solution after which it was carefully washed with water, alcohol and and ether to remove any traces of soap and oils remaining.

The purified wool was ground in a Wiley mill until the powder formed passed through a one hundred mesh sieve. The powder was shaken with water and the larger particles allowed to settle to the bottom after which the upper portion was decanted. The finer particles in this suspension remained suspended in the liquid for several hours.

The buffers were prepared according to Clark[7] and the final pH determined by employing the quinhydrone electrode. The buffer mixtures used were as follows: pH 1.4 to 2.2, potassium chloride—hydrochloric acid mixture; pH 2.4 to 3.8, acid potassium phthalate—hydrochloric acid mixtures; pH 4.0 to 6.0, acid potassium phthalate—sodium hydroxide mixtures.

III. Theoretical

When the movement of suspended particles is observed in successive layers from top to bottom of a closed system as has just been described, it will be seen that particles in the layer next to the glass move towards the cathode as if they were positively charged. By observing layers

from the glass towards the center of the cell, a layer will be found where there is no apparent movement. Below this point, the direction of migration of the particles reverses and their velocity increases until the center is reached.

Since there is a movement of the liquid with respect to the glass wall of the cell as the result of an applied electromotive force, it follows that the liquid must be oppositely charged with respect to the wall. Apparently a double electric layer exists at the interface of liquid and wall, the water being positive and the glass surface negatively charged.

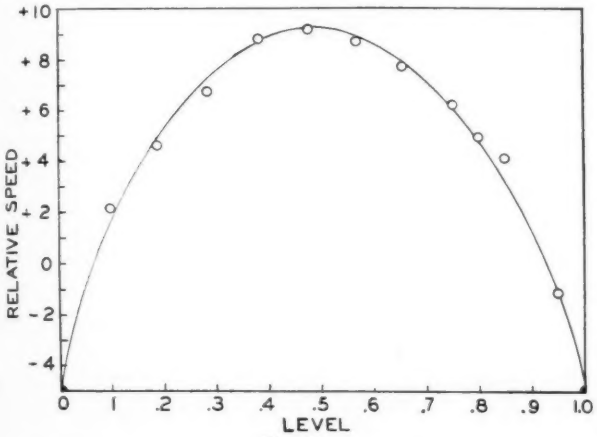

Fig. II

Velocity-level curve for the electrophoresis cell used in the experimental work.

The movement of liquids and suspended particles in flat electrophoresis cells has been investigated by numerous workers. Ellis[8] assumed that for a flat cell of depth X,

$$Vobs = Vp \times Vw$$

where Vobs = the observed electrophoretic velocity of the particle.

Vp = The velocity of the particle relative to the liquid.

Vw = the velocity of the liquid.

In the layer where Vw = O, Vobs = Vp.

In his theoretical considerations Von Smoluchowski[9] has shown that the layers at which the velocity of the liquid is zero are located at approximately 1/5 and 4/5 of the depth of the cell from the top. He also showed that the velocity of a particle in either layer is equal to 3/4 of the observed velocity of a particle in a layer 1/6 of the depth from the top plus 1/4 of the observed velocity of a particle in a layer at 1/2 of the depth. That is,

$$Vp = V1/5 = V4/5 = 1/x \int_{o}^{x} Vobs\ d$$

where x is the depth of the cell.

Experimental work of Ellis and of Swedberg and Anderson[10] have confirmed this theory for flat cells from 50μ to about 1.0 mm. in thickness.

In order to determine that the cell used conformed to this theory Vobs was measured at successive levels in the cell and Vp was obtained by graphical integration. Crude quartz powder was purified as described by Abramson[11], and suspended in distilled water. The movement of the suspended particles in the electrophoresis cell is shown in Fig. II. The shape of the curves depends on the pH of the solution. By graphical integration it was found that the theory of Van Smoluchowski was applicable to the cell used in this work.

IV. The Influence of Size and Shape of Wool Particles on Their Electrophoretic Mobility

The electrophoretic velocity V of a particle relative to a given medium is

$$V = \frac{1}{4\ pi} \cdot \frac{X\ D\ T}{n} \qquad (4)$$

Where X = field strength

D = dielectric constant of the liquid

T = electro-kinetic potential

n = viscosity of the liquid

This relationship was first developed by Helmholtz[12] and later extended by Perrin and Von Smoluchowski[8].

This equation predicts that the electrophoretic velocity is independent of the size and shape of the particle. Abramson[13] has summarized experiments which confirm this. The experiments indicate that the electrophoretic mobility of solid particles like quartz, glass particles, asbestos needles, and tyrosine needles, is independent of size and shape in the size ranges indicated.

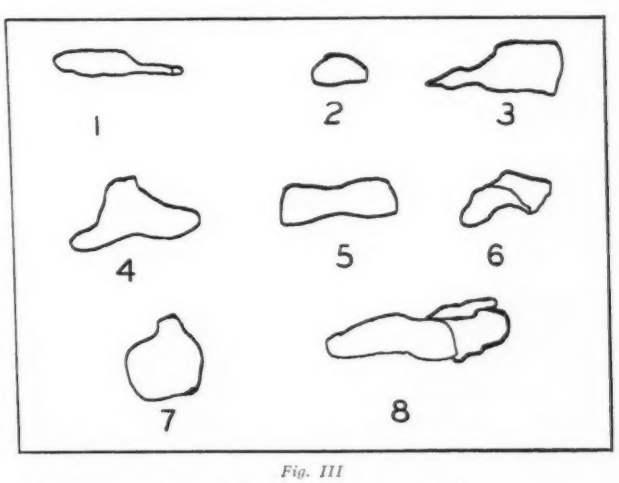

Fig. III

The general outline of the shape of each of the various particles noted. They are drawn to approximately the same scale.

A sample of wool prepared as previously described was suspended in a dilute buffer solution at approximately pH 4.8. The particles varied in size from about 5 to 30 μ The time required for different sizes and shapes of par-

ticles to move across the field was measured. The general outline of the shape and relative size of each of the particles noted is shown in Fig. III while the corresponding time required to cross the scale is given in Table I.

TABLE I. RELATIVE SPEED OF WOOL PARTICLES

Particle	Time
1	14.1 seconds
2	14.3 "
3	13.6 "
4	13.9 "
5	14.1 "
6	13.6 "
7	13.9 "
8	13.5 "

The results in Table I indicate that the mobility of the wool particles is independent of their size and shape.

V. DETERMINATION OF THE ISOELECTRIC POINT

Suspensions of wool were prepared as described in an earlier part of this paper and the electrophoretic velocities of the wool particles determined in suspensions of known pH.

The observed velocities are given in Table II in which each figure is the average of ten observations. These data are plotted in Figure IV which shows the shape of the pH mobility curve. The value assigned to the isoelectric point from this curve is pH 3.4.

The accuracy of this value depends upon the accuracy of the measurements of the pH and of the velocity of the wool particles. The error in the determination of the velocities is practically negligible compared to the error in the determination of the pH of the buffer solutions because of the steep slope of the curve in the isoelectric region. Since the pH is known to be accurate to + 0.05 pH, this may be taken as the limiting error for the isoelectric point of wool.

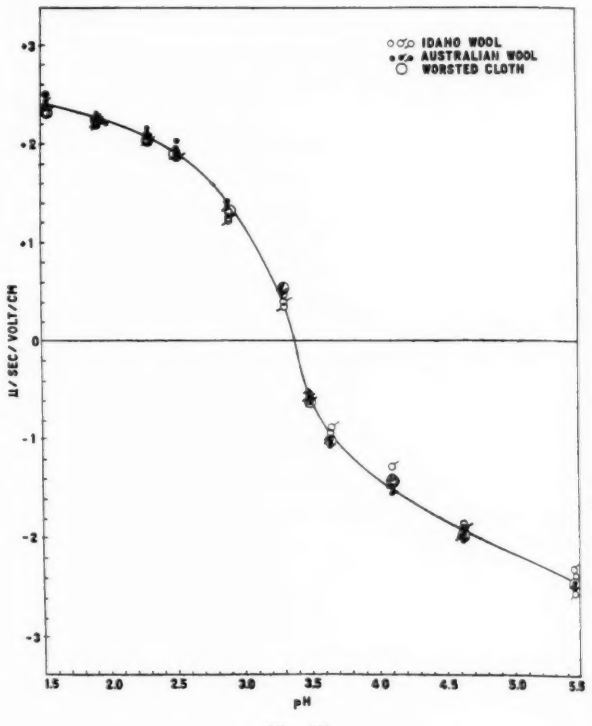

Fig. IV

pH-mobility curve for raw Idaho and Australian wool and for worsted cloth.

V. DISCUSSION OF RESULTS

The isoelectric point 3.4 obtained from the pH—mobility curve is in good agreement with the value of 3.4 obtained by Marston[3] and the value 3.6 = 3.8 obtained by Meunier and Rey[2]. The results of the individual measurements on the raw Idaho and Australian wool and the worsted cloth are also in good agreement with each other.

TABLE II

pH	u/Sec/Volt/Cm. Idaho wool			u/Sec/Volt/Cm. Australian wool			Worsted cloth	Avg. Vel.	Avg. percentage deviation from mean
1.54	+2.50	+2.30	+2.38	+2.44	+2.50	+2.38	+2.32	+2.40	2.91
1.93	+2.20	+2.22	+2.21	+2.29	+2.27	+2.18	+2.16	+2.22	1.70
2.30	+2.08	+2.03	+2.04	+2.16	+2.08	+2.16	+2.04	+2.08	2.11
2.52	+1.93	+1.86	+1.90	+1.93	+1.96	+1.93	+1.89	+1.93	1.36
2.91	+1.32	+1.24	+1.23	+1.40	+1.28	+1.38	+1.31	+1.32	3.92
3.31	+0.48	+0.46	+0.47	+0.52	+0.50	+0.52	+0.54	+0.50	6.26
3.48	—0.54	—0.61	—0.58	—0.55	—0.51	—0.61	—0.62	+0.58	4.84
3.64	—0.94	—0.89	—1.00	—1.03	—0.98	—0.99	—1.03	—0.98	3.98
4.11	—1.42	—1.25	—1.39	—1.50	—1.46	—1.45	—1.42	—1.41	3.56
4.63	—1.86	—1.90	—1.95	—1.90	—1.98	—1.94	—1.98	—1.93	1.94
5.47	—2.61	—2.50	—2.46	—2.46	—2.51	—2.48	—2.45	—2.52	1.74
									3.12 Avg.

Analyses of the samples for total nitrogen gave the following values:

Australian wool	16.19% nitrogen
Idaho wool	16.48% "
Worsted cloth	17.16% "

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6. H. Abramson and H. Freundlich, Z. Phys. Chem. *126*, 25-38 (1927), Uber die Kataphoretische Wanderings-geschwindigkeit grobere Teilchen in Solen und Gelen."
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9. M. Von Smoluchowski in Gratz "Handbuch der Electrizitat und des Magnestisms" Vol. II, 366 (1921).
10. T. Swedberg and H. Anderson. Kolloid Z *24*, 156-165 "Zur Messmethodik der Electrisehen Kataphorese.
11. H. Abramson J. of Gen. Physiol 13, 171 (1929). "Electrokinetic Phenomena."
12. H. Helmholtz and Wied Ann *7*, 337-83 (1879) "Studien uber Electrische Grenzschichten.
13. H. Abramson "Influence of size, shape and conductivity on cataphoretic mobility. Jour. of Physical Chem. *35*, 289-308 (1931).

SEVENTY-FOURTH MEETING, THE RESEARCH COMMITTEE

THE Seventy-four Meeting of the Research Committee of the American Association of Textile Chemists and Colorists was held at the Chemists' Club, New York, N. Y., May 6, 1932.

The following were present:—

L. A. Olney, Chairman
Wm. H. Cady
Howard D. Clayton
Carl Z. Draves
Walter E. Hadley
Jos. F. X. Harold
Heyward F. Lawton
Wm. R. Moorhouse
Donald H. Powers
A. Newton Graves, *Secretary*.

The Chairman reported in regard to the last meeting of the committee which was held in Washington, and it was voted to hold another meeting in that city next year.

The Chairman reported that the Sub-Committee on Fastness of Dyed Wool was planning a conference with representatives of a number of the dyestuff concerns with the object of securing their approval of the recently developed fulling test. It is expected that a complete report will be made at the next meeting.

Upon a motion made and seconded, it was voted that the Chairman constitute himself a committee of one to see about obtaining a knitting machine for the manufacture of the tubing used in the fulling test.

Donald H. Powers, Chairman of the Sub-Committee on Research Program, discussed the work which Dr. Harris has been doing on the Isoelectric point of carbonized wool and the Chairman suggested that a comparative check up be made of the results obtained in dyeing wool treated with sulphuric acid and then thoroughly washed, with similar wool untreated in any way before dyeing.

A report from W. C. Smith on the ageing tests will soon be ready.

Howard D. Clayton, Chairman of the Sub-Committee on Shrinkage of Textile Materials reported that the work in connection with the shrinkage tests was being continued and that a further report would be made later.

The Sub-Committee on Sulphonated Oils, through a letter from the Chairman, Ralph Hart, reported progress.

The new Sub-Committee on Standard Methods of Analysis and Testing reported progress and expects to make a formal report in the fall.

A letter, from a student who wishes some problem to work on in connection with a thesis involving dyestuffs, was read. Several problems were suggested by various members at the meeting.

The meeting adjourned at 5:30 P. M.

Respectfully submitted,

A. NEWTON GRAVES,
Secretary.

EIGHTY-FIRST COUNCIL MEETING

THE Eighty-first Council Meeting of the American Association of Textile Chemists and Colorists was held at the Chemists' Club, New York, N. Y., May 6, 1932, at 2:00 P. M.

The following were present:—

Vice-President: Wm. H. Cady.
Councillor: Wm. R. Moorhouse.
Councillors ex-officio:
Howard D. Clayton, representing Chairman, N. Y. Section.
Carl Z. Draves, representing Chairman, N. N. E. Section.
Heyward F. Lawton, Chairman, R. I. Section.
Prof. L. A. Olney, Chairman, Research Committee.
Donald H. Powers, representing Chairman, Phila. Section.
Secretary: A. Newton Graves.

President Emeritus L. A. Olney presided at the meeting in the absence of President P. J. Wood.

A telephone message was received from President Wood expressing regret at inability to attend.

The report of the last meeting was read and approved.

The Assistant Secretary's balance sheet was read as follows and approved:—

Asst. Secretary's Balance Sheet—April 25, 1932

Cash on hand March 29, 1932		$135.43
Receipts March 29 to April 25, Incl.:		
Application,	1 @ $5.00	5.00
Dues	55 @ $5.00	275.00
		$435.43
Disbursements:		
March 29, Exchange charge		$ .25
March 31, Exchange charge		.69
Cash on hand, Andover National Bank		434.49
		$435.43

The Secretary's balance sheet was read as follows and approved:—

Secretary's Balance Sheet—May 4, 1932

Cash on hand, April 26, 1932		$ 00.00
Receipts, April 26, to May 4, Incl.:		
Applications,	1 @ $5.00	5.00
Applications,	1 @ $2.50	2.50
Dues,	44 @ $5.00	220.00
Reporter sale,	1 @ $ .50	.50
Light Fastness Report,	1 @ $1.25	1.25
		$229.25
Disbursements—None		$00.00
Cash on hand, Nat'l Bank of Commerce & Trust Co.		229.25
		$229.25

The Treasurer's report was not read at the meeting but follows:—

Treasurer's Report—May 4, 1932

General Fund

Cash on hand Mar. 30, 1932	$8376.18
Receipts Mar. 30, 1932 to May 4, 1932	12.10
	$8388.28
Expenditures Mar. 30, 1932 to May 4, 1932	391.54
Balance	$7996.74

Research Fund

Cash on hand Mar. 30, 1932	$2214.22
Receipts Mar. 30, 1932 to May 4, 1932	1250.00
	$3464.22
Expenditures Mar. 30, 1932 to May 4, 1932	791.48
Balance	$2672.74

Bank Balance

General Fund	$7996.74
Research Fund	2672.74
	$10669.48
First National Bank Checking Account	$4722.99
First National Bank Savings Account	5946.49
	$10669.48

The following were elected to membership as of thirty days after the publication of their names provided no objections to any are received by the Secretary:—

Active

Alexander, Sherman Y.—39 Rosewood St., Mattapan, Mass. Chemist, Dyestuffs Corps. of America, 281 Franklin St., Boston, Mass.

Farwell, Robert R.—164 Gallatin St., Providence, R. I. Salesman, E. I. DuPont de Nemours & Co., 709 Hospital Trust Building, Providence, R. I.

Gray, James M.—1205 Fillmore St., Philadelphia, Pa. Boss Dyer, E. L. Mansure & Co., 657 N. 15th St., Philadelphia, Pa.

Howe, Chester A.—35 Crafts Road, Chestnut Hill, Mass. Vice-President and Director, Carbic Color & Chemical Co., Inc., 135 Oliver St., Boston, Mass.

Junior

Rathke, Alfred G.—2617 Broadway, Rockford, Ill. Asst. Dyer, B. Z. B. Hosiery Co., Rockford, Ill.

Student

Gustafson, Bertel William—228 Maple St., Burlington, Vt. Student, Lowell Textile Institute, Lowell, Mass.

Associate

Durfee, Philip S.—1 Dane St., Jamaica Plain, Mass. Treasurer and Manager, W. C. Durfee Co., Inc., 516 Atlantic Ave., Boston, Mass.

A letter from Chas. B. Ordway, Secretary South Eastern Section, was read. Wm. H. Cady was authorized to answer Mr. Ordway's letter.

It was voted that Wm. C. Smith be transferred from Junior membership to Active membership.

A written report from the Committee on Financing the Attendance of Delegates from each Section to the Annual Meeting was read. This report was accepted to be published.

A Committee was appointed to report, at the next Council Meeting, on the exact boundaries of the various local Sections. This Committee consists of the following:

Wm. H. Cady, Chairman
L. A. Olney
A. Newton Graves.

Wm. H. Cady suggested that Article XIII, of the Constitution, be changed, so as to read, in the first sentence, "Twenty-five or more *Active* members residing in any

district may notify the Council of their desire to form a Section."

The Secretary reported that 231 members had not paid their 1932 dues. It was voted that these members be dropped in accordance with the Constitution.

Respectfully submitted,
A. NEWTON GRAVES, *Secretary.*

APPLICANTS FOR MEMBERSHIP

Active

Sidney S. Henwood, Colorist, Alex. Smith & Sons Carpet Co., Yonkers, N. Y. Sponsors: Hector G. McDonald and A. Newton Graves.

Leo I. Monaghan, Chemist and Colorist, 136 N. Delaware Ave., Philadelphia, Pa. Sponsors: John R. McNamara and W. G. Hamlen, Jr.

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Associate

John B. Trotter, Salesman, Swann Chemical Co., Birmingham, Ala.

Clifford M. Stodghill, Pres. and Mgr., Stodghill & Co., 530 Marietta St., N. W., Atlanta, Ga.

SPRING MEETING, SOUTH CENTRAL SECTION

THE spring meeting of the South Central Section of the A.A.T.C.C. was held at the Hotel Patten, Chattanooga, Tennessee, on the evening of May 21st, 1932. Thirty-five members and guests were present.

During the dinner an enjoyable program of music was furnished by Al Morgan and his stringed orchestra. Mr. Morgan also gave an entertaining "chalk talk."

The minutes of the previous meeting were read and approved.

Mr. Harry Miller, owner of one of Chattanooga's leading department stores, gave an enlightening talk on "What the Retailer Expects from the Textile Chemist and Colorist." A lengthy discussion followed, in which a number of those present participated.

Mr. Homer Whelchel of the Central Franklin Process Company spoke on "The Dyeing of Cotton in the Franklin Machine." His talk was closely followed and at the conclusion there were a number of questions, asked and answered.

The following were made members of the Sectional Committee: Harold Schroeder, Chairman, S. I. Parker, W. S. McNab, G. H. DuBois.

Mr. R. S. Wheeler was elected member of the national nominating committee.

There being no further business the meeting was adjourned.

Respectfully submitted,
ANDREW KELLY,
Secretary.

ASSOCIATION BADGES

The lapel button badge illustrated herewith is worn by members of the American Association of Textile Chemists and Colorists.

The three "rings" are enameled in red, yellow and blue, respectively, and the initials and border are brought out in gold. The general effect is exceedingly attractive.

Badges may be secured at $1.50 each by addressing the Secretary.

A. NEWTON GRAVES,
Franklin Process Co.,
Providence, R. I.

AMERICAN DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto

LOUIS A. OLNEY
Professor of Chemistry and Dyeing, Lowell Textile Institute
Directing Editor

NORMAN ALBIN JOHNSON
Managing Editor

MYRON DREW REESER
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Volume XXI June 20, 1932 No. 13

THE RETAIL TESTING LABORATORY

ONE of the most important developments in the last few years is the establishment of testing departments in the various large retail department stores and mail order houses. A short time ago a description of the testing laboratory of Sears, Roebuck & Co. was published in the REPORTER. Since then the application of a precision test meter as used in the laboratory of Montgomery Ward & Co. has been described in one of our issues. In this issue appears a paper entitled "The Research Chemist Looks at Consumer Textiles," which was presented at the May meeting of the New York Section of the American Association of Textile Chemists, and which contains a description of the methods of testing fabrics and other materials, as followed in the testing bureau of R. H. Macy & Co., one of the large department stores of New York City.

The benefits of these testing laboratories are two-fold. They prevent the retailer from purchasing defective goods in the first place, and their stamp of approval is also the customer's protection. As explained in one of the articles mentioned above, the fact that scientific cleverness is producing beautiful and substantial fabrics, is also producing most remarkable imitations, creating good looking fabrics from poor products, and combining, treating and manipulating fibers in such ways that it is often impossible even for an expert to identify them by mere sight or feel. There is a market for all kinds of goods, cheap and costly, but the retailer should know the exact value of the materials in which he deals. The only way for the retailer to determine whether he is getting his money's worth and whether he in turn is giving the consumer what he pays for is by testing and analyzing his merchandise before it is bought or sold. Professional buyers have found that it does not pay to take the claims of the distributor too literally and that price is not the only criterion of quality.

By testing the goods before they are placed on sale the retailer protects himself against both the distributor and the consumer. Goods returned by customers with claims are immediately identified as to quality by reason of the tests conducted beforehand and the validity of the claim quickly determined. If only quality goods are accepted from the manufacturer, as determined by test, the consumer will have no basis for returning goods purchased from the retailer.

Although primarily established to protect the retailer in his dealings with the manufacturer, the testing laboratories also guarantee to the retailer's customers the quality, as determined by the tests. How the benefits of these tests are passed on to the customer depends upon the integrity of the retailer, but obviously there would be no point in establishing a testing department to determine the actual value of a certain piece of merchandise unless the results of the tests were used to determine which material the retailer should buy. The ordinary practice is for the professional buyer to obtain samples from the various distributors and then have them tested in the laboratory. His orders are placed in accordance with the results of these tests. Should the shipment not measure up to the quality of the sample submitted this is quickly determined by a checking test applied to samples taken directly from the shipment lot.

By protecting both the retailer and the consumer from defective merchandise it also stimulates the production of better products and tends to eliminate the distribution of worthless merchandise through the particular channels served by those retailers employing the advantages of a testing laboratory in making their purchases.

Such a method of protecting the consumer as outlined a few paragraphs above will ultimately work out to the advantage of the retailer. By maintaining a standard quality by reason of their tests, they will create in the minds of the consumers a confidence in the products they market, thus stabilizing their business. By applying the results of tests in the claims made in their advertising it will go still further to create this much desired confidence among the consumers.

In summing up the advantages of a retail testing bureau the following should be included: It lessens the losses of the retailer in respect to goods returned by consumers, it protects the retailer and the consumer from the unwarranted claims of a manufacturer, it brings about a maintenance of a standard of quality thereby increasing the consumers' confidence in the retailer, and it tends to eliminate poor products by increasing the demand for better products.

The testing laboratory of the retail store has its place in the movement for quality products which is now underway and which has the backing of many important manufacturers.

Lowell Textile Graduates 29

A class of 29 students was graduated from the Lowell Textile Institute on June 7th. Twenty-six received degrees and three received diplomas. Herbert Bagshaw was awarded a gold medal by the National Association of Cotton Manufacturers for excellence in the study of cotton. The annual book prizes given by Prof. Louis A. Olney, Head of the Department of Chemistry and Dyeing were awarded as follows for excellency in first and second year chemistry: Second year: Robert T. Graham and Robert Thomas; First year: Joseph Shain and James C. deGruchy. The address of welcome was delivered by Pres. Charles H. Eames. The principal speaker of the day was Prof. George B. Haven of the Massachusetts Institute of Technology, who spoke on "The Spirit of Science."

Graduates from the Department of Chemistry.

Diplomas were presented and degrees awarded by President Eames. The following were awarded the degree of Bachelor of Textile Chemistry: Marie Barry, Arthur Bertrand, Leo Gleklen, Joseph Hardman, Stanley Hockridge, Lorne Howard, Daniel King, Bessie Lifland, John McDonald, Jr., Barton McQuaid, John Meehan, Herbert Meinelt, Edward Moran, Anthony Orlauski, Hiag Piligian, Arthur Spaulding, Francis Toher, and Samuel Walker.

Lotte Chemical Company Formed

Announcement was recently made of the formation of the Lotte Chemical Co. with headquarters at 245 Broadway, Paterson, N. J. They will handle a complete line of soaps, chemicals, oils and gums for the textile trade as well as paper and paper products for the textile and other industries. The president of the company is C. Walter Lotte, president of the Paterson Board of Works, who has been a prominent figure in the dyeing branch of the silk industry there. For many years he was manager of the Dundee Lake Works of the National Silk Dyeing Co. The treasurer and head of the sales department is Paul L. Miller, who has had considerable experience in the textile industry. His last connection was as manager of the dyeing and finishing plant of the Amalgamated Silk Co. in Allentown, Pa., which was later acquired by the National Silk Dyeing Co.

Survey on Dye Plant Corrosion

A technical bulletin showing how Monel metal is being used to solve corrosion and other problems in dyeing, stripping and bleaching in the textile field, has just been issued by the International Nickel Company. It contains the results of extensive study and research by the company's development and research department and independent laboratories and is in the nature of a reprint of an article by F. L. LaQue published in the AMERICAN DYESTUFF REPORTER.

Designated as Technical Bulletin TS 3, it is being distributed without charge on application to the Editorial Department, The International Nickel Company, Inc., 67 Wall Street, New York City.

New Permutit Bulletin

"Purifying Water for the Textile Industry," is the title of a new 12-page bulletin published by the Permutit Company, 440 Fourth Avenue, New York. It covers recent developments in Zeolite water softening, the use of chemicals as aids in coagulation, and modern filter plants for the removal of color and turbidity. It describes the advantages secured through water treatment, and shows several flow diagrams of actual installations. A copy will be sent free on request.

German Dye Trust Acquires Ownership of Its "Leunasaltpeter" Works

According to Trade Commissioner William T. Daugherty, Berlin, I. G. Farbenindustrie A. G. (German dye trust) recently acquired the 6,000,000-mark share capital of Chemische Werke Lothringen, of Gerthe in Westphalia. This enterprise makes the "Leunasaltpeter" (ammonium sulphate-nitrate) often erroneously believed, because of its name, to be made at the I. G.'s "Leunawerke." The I. G. made a community of interests with Bergbau A. G. Lothringen in 1928, when it acquired half-control of "Chemische Lothringen." In 1931 it acquired another 100,000 marks shares, giving it majority control; recently it bought in the remaining 2,900,000 marks. This was accomplished by share-exchange with Bergbau A. G. Lothringen.

Portuguese Market For Coal-Tar Dyes

According to Consul Leslie H. Davis, Oporto, although dyes are not shown separately in Portuguese statistics, trade estimates place incoming shipments at about 70,000 kilos per month, of which about 20,000 kilos are sulphur black dyes. Germany is reported to supply about 65 per cent of the imported coal-tar dyes, Swiss manufacturers 20 per cent, France about 12 per cent and the United States 3 per cent. The textile industry is the chief dye consuming channel, with Oporto and Covilha as the chief purchasing centers.

The Dyeing Machine---I

(Continued from page 386)

taining dye. But, even today, we have many who employ this elementary method—our hand skein kettles, our raw stock kettles or tubs, our indigo vats. Little have they changed in all these centuries.

Among the wild tribes of the Himalava mountains and other semi-civilized races, raw wools, cottons or yarns are dyed today in stone crocks over an open fire. Much of the yarn used in the oriental rugs is so colored. There are records of tribes using bark containers for boiling, and this probably is the most primitive of any known method. Heat was applied by inserting heated stones into the liquid. Bound by untold generations of ancestral procedure and untouched by the germ of commercialism such methods go unchallenged. But even there, he who has, thru some European source, obtained a brass or copper kettle is both envied and respected. And so, by slow development, we find the stone or earthen-ware crock giving place to the more substantial metal kettle (Fig. 1), surely a marked advance when heat is to be applied directly by naked flame.

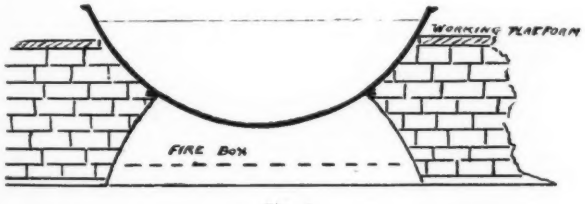


Fig. 1
Sectional View of Direct Heated Cast Iron Stock Kettle.

All thru this period the dyer was the master, there were no guilds, or factory organizations. Then came the harnessing of steam, and with it the development of our modern industrial system, and with that rapid strides in the mechanical development. With mechanical development came a complexed fabric of factory organization which today is by no means complete.

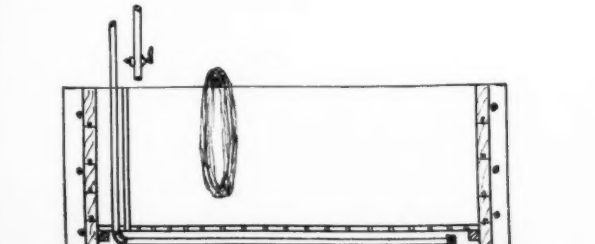


Fig. 2
Sectional View of Hand Yarn Kettle.

With the development of steam, the dye kettle or cauldron was taken from the naked flame and heated by steam. (It is of interest to know that as late as 1908 there was a mill in the vicinity of Boston that operated a pair of cast iron dye kettles heated by a wood fire. The dyer held the opinion that hickory gave the best results, while the owner thought that maple produced a more uniform heat and, therefore, more level dyeing. Yes—there is or was much technique to operating an opened fired kettle.)

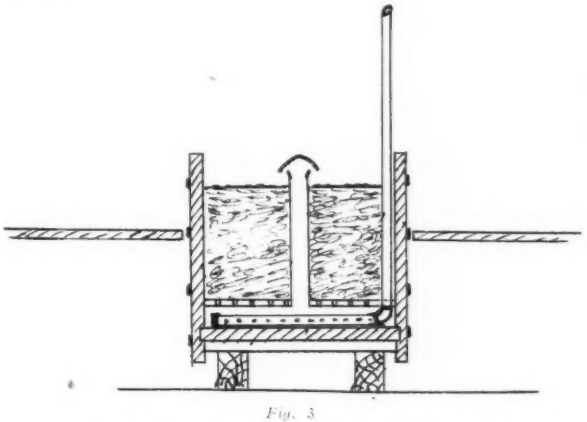


Fig. 3
Sectional View of a Common Type of Raw Stock Tub.

By slow evolution the kettle advanced to its present well known form, rectangular for yarns (Fig. 2 and 3), and round for stocks or loose material. Live steam was blown in thru an open pipe. Then came improvements in the manner of feeding the steam to equalize the boiling. Suitable perforated pipes properly laid, false bottoms of various types and other refinements were developed to prevent tangling, felting, or matting of the material in process of dyeing, until, today, we have in the modern dye house a hand kettle which can be kept under practical control by those skilled in its operation.

The Present Tub

The present tub or kettle is constructed of wood tank stock, and this may or may not be lined with some acid resisting metal. Many yarn kettles are today constructed wholly of metal, the vat being supported and made rigid by a suitable metal frame. In some raw stock dye houses the kettles are made of reinforced concrete.

What should the busy executive know about hand kettles? Is it enough for him to know that they are round or rectangular wooden vats heated by steam thru

perforated pipes laid in the bottom of the vat? He should know the following:

1. The manual operations necessary to produce constant and satisfactory results, for the particular type of dyeing at hand.
2. When hand kettles can be employed advantageously.
3. What constitutes the best vat construction, in wood, metal reinforcements, metal vat construction or linings, and when demanded.
4. The most advantageous arrangement of vats, as regards working space for efficient routine performance.
5. And he should of course have a general idea of the procedure.

For some years after the inception of the factory system, during which the mechanical development of yarn making and weaving machinery had already reached a high degree of perfection, we still find the dyehouse obscured in the fog of their open vats and bound to their traditional but somewhat improved hand kettles.

Reel Skein Machine

Some of the earliest efforts at dyeing machine development were, as to be expected, attempted duplication of the hand process by mechanical means. Therefore, many patented and unpatented ideas developed around cam motions, both simple and complicated, to raise a series of sticks placed in a horizontal plane directly above and extending across the vat, upon which sticks the skeins were placed. The cam motion carried these sticks forward an interval, lowered them and brought them back thru the solution, raising them at the end of the vat to repeat the operation, thereby simulating the hand operation. Others used rollers located above the vat upon which the skein was placed as an endless belt with its lower portion in the dye-liquor. As the roller revolved the skein turned slowly. Spencer's machine and one produced by D'haitres were based upon these principles and have been made practical in recent years thru the use of positive driving power, effective apparatus for raising and lowering rollers, and the composition of the rollers. Smith Drum Co. and A. W. Buhlmann make machines of this type and their many installations can be seen in representative plants thruout the country.

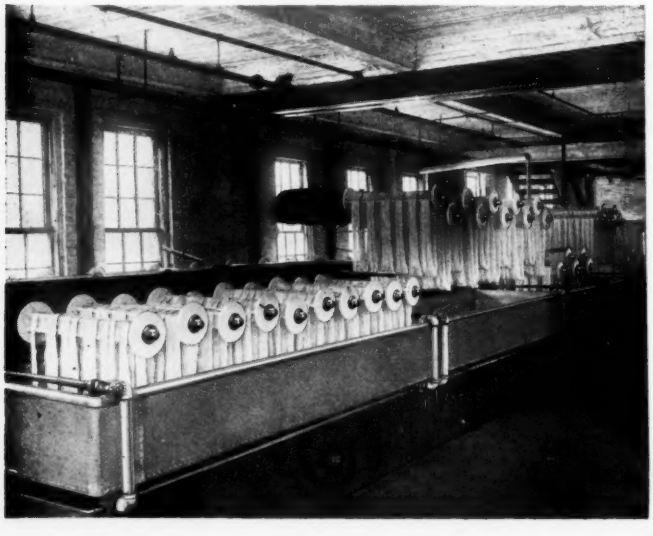


Fig. 4

Buhlmann Reel Skein Dyeing Machine.

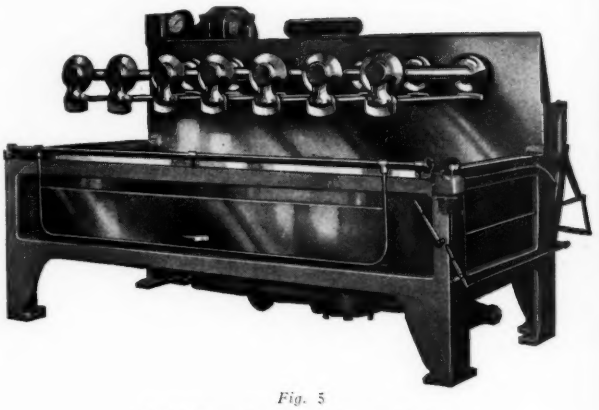


Fig. 5

Smith-Drum Reel Skein Dyeing Machine.

(To be continued in the next issue. All types of modern dyeing machines will be illustrated.)

Rumania Consumption of Dry Colors

According to Consul Alfred W. Donegan, Bucharest, official statistics showing the annual consumption of dry colors in Rumania are not available, but estimates of the trade place the total consumption at 5,500 to 6,500 metric tons valued approximately at $450,000 to $540,000. There are several domestic producers of dry colors, but it is necessary to import considerable quantities of high-grade products. It is estimated that 60 per cent of the total consumption of earth colors are of domestic manufacture, while about 40 per cent of the higher grade products are imported. During 1930, imports of dry colors into Rumania amounted to 5,693 metric tons valued at $666,378.

Russian Dyestuff Industry Plans Expansion

The 1931 Russian coal-tar dye output was anticipated at 41,000 metric tons and it is expected that the 1932 output will reach 75,000 tons. It is reported that as a result of the opening of a number of new dyestuffs plants and reconstruction of those already in operation, the production costs of the industry have been reduced 35 per cent below the 1927-28 levels. The principal project for the expansion of the aniline dyestuffs industry during the second Five Year Plan is the opening of a large plant in the Ural-Kuznetsk area.

NEW PATENTS

(*Abstracted by Synthetic Organic Chemical Mfrs. Assn.*)

Wool Azo Dyestuffs and Process of Making Same. (New acid wool dyestuffs yielding reddish shades of good fastness; obtained, for example, by transforming 4.4'-diamino-diphenyl-dimethylmethane (obtained according to U. S. Patent No. 1,525,738) into the tetrazo-compound in the customary manner and coupling with the sodium salt of 2.8-dihydroxynaphthalene-6-sulfonic acid in a weak alkaline solution.) Georg Kalischer and Rudolf Schuele, of Frankfort-on-the-Main, and Hans Schindhelm, of Frankfort-on-the-Main-Fechenheim, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,856,-217, May 3, 1932.

1-(3'.4' - *Dichlor-6'-Sulphophenyl*) - 5 - *Pyrazolones and Azo Coloring Matters Derived Therefrom.* (Obtained by diazotizing 3.4-dichlor-aniline-6-sulfonic acid, reducing, and condensing with ethyl acetoacetate or ethyl oxalacetate by any suitable method. The new pyrazolones can be easily coupled in alkaline solution with various diazo, diazo-azo, or tetrazo bodies, etc., for the production of azo or polyazo coloring matters; dye wool from an acid bath yellw to red to brown shades.) Leon W. Geller, of Hamburg, N. Y., assignor to National Aniline & Chemical Co., Inc., of N. Y., N. Y., No. 1,856,413, May 3, 1932.

Printing Pastes from Dyestuffs and Process of Preparing Them. (As new products, printing pastes from vat dyestuffs, containing condensation products obtained by heating urea with an excess of butylene glycol.) Albrecht Schmidt, of Frankfort-on-the-Main, Ger., assignor to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,-856,434, May 3, 1932.

Process of Preparing Vat Dyestuffs. (Clearer and faster vat dyestuffs are obtained by reacting 3.4.8.9-dibenzpyrene-5.10-quinones with an alkaline oxidizing agent, such as sodium hypochlorite; dye vegetable fibers bright golden-orange and yellow tints.) Georg Kranzlein, Martin Corell, and Heinrich Vollmann, of Frankfort-on-the-Main-Hochst, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,856,710, May 3, 1932.

Benzanthrone-Derivatives and Process of Preparing Them. (New compounds having no dyestuff character, obtainable by condensing benzanthrone-peri-dicarboxylic acid anhydride or a derivative or a substitution product thereof with an aromatic ortho diamine. Said compounds may be converted, by further heating them either alone or in the presence of a solvent or a diluent, into such dyestuffs as are described in the U. S. application Serial No. 342,662 filed Feb. 25, 1929, in the name of Georg Kranzlein, Heinrich Greune, Martin Corell and Heinrich Vollmann; yield on cotton orange to brown to red tints.) Georg Kranzlein and Heinrich Greune, of Frankfort-on-the-Main-Hochst and Gerhard Langbein, of Hofheim-in Taunus, Ger., assignors to General Aniline Wks., Inc., N. Y., N. Y., No. 1,856,711, May 3, 1932.

Azo-Dyestuffs Containing Chromium and Process of Making Same. (Comprises baking the dyestuff from diazotized 5-nitro-4-chloro-2-amino-1-phenol and 2-(4'-methyl) - phenylamino - 5 - hydroxynaphthalene-7-sulfonic acid, with chromium acetate in presence of glycerine; dye animal and vegetable fibers yellow to orange to red-brown to black to blue to blue-grey and greenish-blue tints.) Fritz Straub, Hans Mayer, and Walter Anderau, of Basel, Switzerland, assignors to the Firm of Society of Chemical Industry in Basle, of Basel, Switzerland, No. 1,856,796, May 3, 1932.

Dyestuffs of the Anthraquinone Series and Process of Making Same. (For example, 1-(4'-amino)-phenylamino-4-amino-anthraquinone is obtained by the reaction of 1-methoxy - 4 - amino-anthraquinone with para-phenylene-diamine and dimethylaniline; dye cellulose esters and ethers, such as acetate silk or varnish or lacquers and non-mordanted wool in an acid bath fast greenish-blue.) Oscar Bally, Paul Grossmann, and Friedrich Felix, of Basel, Switzerland, assignors to the Firm of Society of Chemical Industry in Basle, of Basel, Switzerland, No. 1,856,802, May 3, 1932.

New Vat Dyestuffs of the Anthraquinone Series. (Olive shades of good fastness, obtainable by reacting upon an anthraquinone acridone with alpha aminoanthraquinone in the presence of a high boiling organic solvent, such as nitrobenzene, a suitable acid binding agent (sodium acetate-magnesium oxide, for example) and a copper catalyst.) Robert Berliner, of Leverkusen-on-the-Rhine, Ger., assignor to General Aniline Wks., Inc., N. Y., N. Y., No. 1,857,232, May 10, 1932.

New Monoazo-Dyestuffs. (Obtained by diazotizing 4-nitro-1-amino - benzene-2-sulfanilide - N - oxethyl sulfuric acid ester (sodium salt) in aqueous solution and combining with a solution of 2-methylamino-naphthalene-7-sulfonic acid; dye wool from an acid bath clear reddish-blue shades of good fastness.) Winfrid Hentrich, of Erlangen, Karl Burr and Hugo Schweitzer, of Leverkusen-Wiesdorf, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,557,244, May 10, 1932.

Vat Dyestuffs of the Thionaphthene-Indolindigo Series. (As a new product, the 6-methoxy-2-thionaphthene-5'7'-dichloro-3'-indolindigo, dyeing cotton clear orange tints of good fastness to washing, boiling and light.) Theodor Meissner, Hans Heyna, and Ernst Fischer, of Frankfort-on-the-Main-Hochst, Ger., assignors to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,857,250, May 10, 1932.

New Dyestuffs of the Thionaphthene-Indigo Series. (Obtained by condensing 6-chloro-3-hydroxy-thionaphthene with a reactive alphaderivative of 5-bromo-isatin, for instance, the alpha-chloride or alpha arylides; yield grey shades on vegetable and animal fibers.) Norbert Steiger, of Frankfort-on-the-Main, Ger., assignor to General Aniline Wks., Inc., of N. Y., N. Y., No. 1,857,264, May 10, 1932.

Clemson News

Dr. H. B. Marshall, printing expert with the Ciba Company, Philadelphia, Pa., recently spoke to the students of Textile Chemistry and Dyeing at the Textile Department of Clemson College. In the morning session he gave some

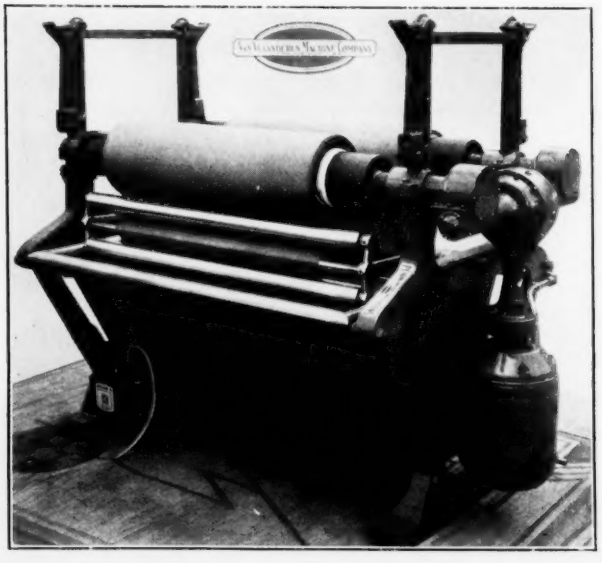
very instructive talks on the printing processes, and in the afternoon demonstrated the various printing methods on the hand-press in the laboratory. Both the talks and demonstrations were very instructive from the students' standpoint.

Automatic Constant Cloth Speed Jigg

In this jigg every yard from the first to the last, so the manufacturer claims, passes through the liquor at exactly the same speed. In the ordinary jigg the speed at the end of a run is usually about four times as great, depending upon the size of the roll, as at the beginning.

There is a certain speed at which the cloth should be run through the dye liquor for the most satisfactory dyeing. By running the jigg at that proper speed from the beginning to the end better dyeing should result. Heavier goods should be run slower; other qualities should be run faster. For this reason, two speed, three speed and if conditions demand it, four speed motors are available. Each speed is a constant speed. If there is a speed limit for satisfactory dyeing, this jigg can be run at that speed constantly instead of only ¼ that limit speed at the beginning of the run. The new jigg therefore, according to the manufacturer, promises a marked increase in production.

The tension is adjustable and when set, remains the same from one end of the run to the other, it does not vary as the batch-up roll increases in diameter. The tension can be set at anything from a very heavy tension to no tension at all. As a matter of fact, the goods can be run through the liquor *loose*. This is possible because both batch rolls are positively driven. In the old type of jigg it is necessary for the operator to continually adjust the tension in an attempt to keep it constant. On the old jigg it is impossible to operate without tension because the unrolling batch roll always must be pulled around, virtually driven by the cloth. The same applies to the gearing and clutches. No matter how light they may be made to run, by the use of ball bearings, etc., the drag is always there. On this new jigg, since both rolls are driven, there is no drag.



The jigg has an arrangement whereby it can be set for automatic reversing or for stopping at the end of any predetermined number of runs. These reversals or stops occur at a predetermined point and exactly at the same point each time regardless of the size of the roll or any shrinkage or stretch which may take place during a run.

The illustration shows this new type of jigg as manufactured by the Van Vlaanderen Machine Co. of Paterson, N. J.

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

DYER

Six years' experience at bleaching and dyeing wool, cotton, jute and union raw stocks and yarns. Thoroughly experienced in all stages of carpet manufacture. Age, 26; married. Address: Classified Box No. 731, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

DYER AND CHEMIST

Twelve years' experience dyeing wool, worsted rawstock, yarn, piece and unions. Cotton rawstock and yarn. Will go anywhere. Address Box No. 734, American Dyestuff Reporter, 440 Fourth Avenue, New York, N. Y.

LABORATORY MAN

Thorough knowledge of dyestuffs testing, also knowledge of textile specialties. Desires connection with progressive concern. Age 27. Best references. Moderate salary. Address Box No. 735, American Dyestuff Reporter, 440 Fourth Avenue, New York, N. Y.

POSITION WANTED

Resident manager, superintendent, colorist or dyer for the processing of cotton, rayon, silk, and mixed piece goods. Formerly connected with Hartsville Print & Dye Works, Hartsville, S. C.; Waldrich Bleachery, Delawanna, N. J.; Bronx Finishing Company, New York City; The Aspinook Company, Jewett City, Conn.; The United States Finishing Co., Pawtucket, R. I., and Norwich, Conn. Willing to locate immediately in any part of the country. Address Box No. 736, American Dyestuff Reporter, 440 Fourth Avenue, New York.

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